Global Mapper User's Manual

Download Offline Copy

If you would like to have access to the Global Mapper manual while working offline, click here to download the manual web pages to your local hard drive. To use the manual offline, unzip the downloaded file, then double-click on the Help_Main.html file from Windows Explorer to start using the manual. If you would like context-sensitive help from Global Mapper to use the help files that you have downloaded rather than the online user's manual, create a Help subdirectory under the directory in which you installed Global Mapper (by default this will be C:\Program Files\GlobalMapper10) and unzip the contents of the zip file to that directory.

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Map GPS Coordinates - GPS Map Coordinates - GPS Coordinates Map

ABOUT THIS MANUAL

This manual is for Global Mapper v12.00. Earlier versions of the software may not contain all the features documented here. Later versions may contain additional features, or behave differently. To see the version of your software, select [Help/About Global Mapper] from the Menu Bar. The demo version contains some but not all of the features available through a registered version of Global Mapper.

The Global Mapper Web Site found at: http://www.globalmapper.com maintains a list of changes and supported formats, features, links to sample data as well as current information about the Global Mapper software. Please refer to this site to obtain the latest copy of the software.

Earlier versions of the software should be uninstalled [Start/Settings/Control Panel/Add, Remove Programs] before installing later versions.

System Requirements

Global Mapper software is compatible with Windows 98, Windows NT, Windows 2000, Windows ME, Windows XP (32 and 64-bit versions), Windows Vista (32 and 64-bit versions), Windows 7 (32 and 64-bit versions), and Windows Server 2003. You may also be able to run Global Mapper on a Macintosh computer using an emulator like VirtualPC, Parallels, or Boot Camp, or on a Linux OS under WINE. The minimum system requirements are 64 MB of RAM and 40 MB of hard drive space for the installation. Space requirements for the data are typically higher depending upon the size of the dataset.

Download

Step 1: Download the Global Mapper software (latest version) from the Global Mapper website: http://www.globalmapper.com by following the Download link on the left side of the main page.

Step 2: Go to the directory in which you saved the viewer in Step 1 and select the global_mapper11_setup.exe icon

Step 3: Double click the icon. Select "YES" to install the program. Allow the installation to progress normally and select any defaults it asked for.

Registration

You can freely download the latest version of Global Mapper by following the instructions above. However, without a valid username and registration key, several significant functions will be unavailable. In particular, if you do not obtain a valid registration key for your copy of Global Mapper you will be subject to the following limitations:

- You will be unable to export data to any format.
- You will be limited to loading a maximum of 4 data files at a time. With the full version, you can load any number of data files simultaneously.
- You will be unable to view loaded elevation data in 3D.
- You will be unable to load workspaces.
- You will be unable to do line of sight calculations using loaded elevation data.
- You will be unable to perform view shed analysis using loaded elevation data.
- You will be unable to perform cut-and-fill volume calculations using loaded elevation data.
- You will be unable to work with map catalogs.
- You will be unable to download data from WMS map servers.

- You will be unable to save rectified imagery to fully rectified files.
- You will not be able to print to a specific scale (i.e. 1:1000).
- You will have to endure a nagging registration dialog everytime that you run the program.
- You will not be eligible for free email support.

CLICK HERE TO REGISTER your copy of Global Mapper and obtain access to all of its powerful features,

2 MENUBAR AND TOOLBAR

This section briefly reviews the menus and commands in order to understand the basic purpose of each.

The toolbar is displayed across the top of the application window, below the menu bar. The toolbar provides quick mouse access to many tools used in Global Mapper. To hide or display the toolbars or to switch to the old Toolbar display, which some users prefer, use the View menu commands for the toolbar.

Menu Headings

- File Menu
- Edit Menu
- View Menu
- Tools Menu
- Search Menu
- GPS Menu
- Help Menu

File Menu

The File menu offers the following commands:

- Open Data File(s) Command
- Open Generic ASCII Text File(s) Command
- Open All Files in a Directory Tree Command
- Open ECW File from the Web Command
- Open Data File at Fixed Screen Location
- Unload All Command
- Create New Map Catalog Command
- Find Data Online Command
- Download Online Imagery/Topo/Terrain Maps
- Load Workspace Command
- Save Workspace Command
- Save Workspace As Command
- Run Script Command
- Capture Screen Contents to Image Command
- Export Global Mapper Package File Command
- Export PDF File Command
- Export Gridded Elevation Data
    - Export Arc ASCII Grid Command
    - Export BIL/BIP/BSQ Command
    - Export BT (Binary Terrain) Command
    - Export DEM Command
    - Export DTED Command
    - Export DXF 3D Face File Command
    - Export DXF Mesh Command
    - Export DXF Point File Command
    - Export Erdas Imagine Command
    - Export Float/Grid Command
    - Export Geosoft Grid Command
    - Export GeoTIFF Command

- Export Global Mapper Grid Command
- Export Gravsoft Grid Command
- Export HF2/HFZ Command
- Export Idrisi Command
- Export JPEG2000 Elevation Command
- Export Lidar LAS Command
- Export Leveller Heightfield Command
- Export Optimi Terrain Command
- Export PGM Grayscale Grid Command
- Export PLS-CADD XYZ File Command
- Export RockWorks Grid Command
- Export STL Command
- Export Surfer Grid (ASCII Format) Command
- Export Surfer Grid (Binary v6 Format) Command
- Export Surfer Grid (Binary v7 Format) Command
- Export Terragen Terrain File Command
- Export Vertical Mapper (MapInfo) Grid File Command
- Export Vulcan3D Triangulation File Command
- Export XYZ Grid Command
- Export ZMap Plus Grid File Command

- Export Raster/Imagery Format
  - Export BIL/BIP/BSQ Command
  - Export BMP Command
  - Export BSB Marine Chart Command
  - Export ECW Command
  - Export Erdas Imagine Command
  - Export GeoTIFF Command
  - Export Idrisi Command
  - Export JPG Command
  - Export JPG2000 Command
  - Export KML/KMZ Command
  - Export NITF Command
  - Export PNG Command
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  - Export Arc Ungenerate Command
  - Export CDF Command
  - Export CSV Command
  - Export Delft 3D (LDB) Command
  - Export DeLorme Text File Command
  - Export DGN Command
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  - Export DXF Command
  - Export DWG Command
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  - Export Garmin WPT (PCX5) File Command
  - Export GOG (Generalized Overlay Graphics) Command
  - Export GPX Command
  - Export Hypack Linefile
  - Export InRoads ASCII Command
  - Export KML/KMZ Command
  - Export Landmark Graphics Command

- Export Lidar LAS Command
- Export LMN (Spectra Line Management Node) Command
- Export Lowrance LCM (MapCreate) File Command
- Export Lowrance USR Command
- Export MapGen Command
- Export MapInfo MIF/MID Command
- Export MapInfo TAB/MAP Command
- Export MatLab Command
- Export Moss Command
- Export NIMA ASC Command
- Export Orca XML Command
- Export OSM (OpenStreetMap.org) XML Command
- Export Platte River/WhiteStar/Geographix File Command
- Export PLS-CADD XYZ File Command
- Export Polish MP (cGPSMapper) File Command
- Export SEGP1 Command
- Export Shapefile Command
- Export Simple ASCII Text File Command
- Export Surfer BLN Command
- Export SVG Command
- Export Tom Tom OV2 File Command
- Export Tsunami OVR Command
- Export UKOOA P/190 Command
- Export WAsP MAP File Command
- Export ZMap+ XYSegId File Command

- Export Web Formats (Google Maps, VE, WW, etc.)
  - Export Bing Maps (Virtual Earth) Tiles Command
  - Export Google Maps Tiles Command
  - Export KML/KMZ Command
  - Export OSM (OpenStreetMaps.org) Tiles Command
  - Export SVG Command
  - Export TMS (Tile Map Service) Tiles Command
  - Export VRML Command
  - Export World Wind Tiles Command
  - Export Zoomify Tiles Command
- Batch Convert/Reproject
- Combine Terrain Layers
- Generate Contours Command
- Generate Watershed Command
- Print Command
- Print Preview Command
- Print Setup Command
- Exit Command

Open Data File(s) Command

The Open Data File(s) command allows the user to open additional data files into the main Global Mapper view. If no other data is already loaded and the user has not explicitly set a projection, the view will adopt the projection and datum of the first data file selected for loading. If other data is already loaded, the selected data files will be displayed in the current projection/datum.

The data will automatically be displayed at the proper location relative to other loaded data, creating a mosaic of data that is properly placed spatially. You don't have to do anything special to create mosaics of multiple files, this happens simply by loading the geo-referenced files into Global Mapper.

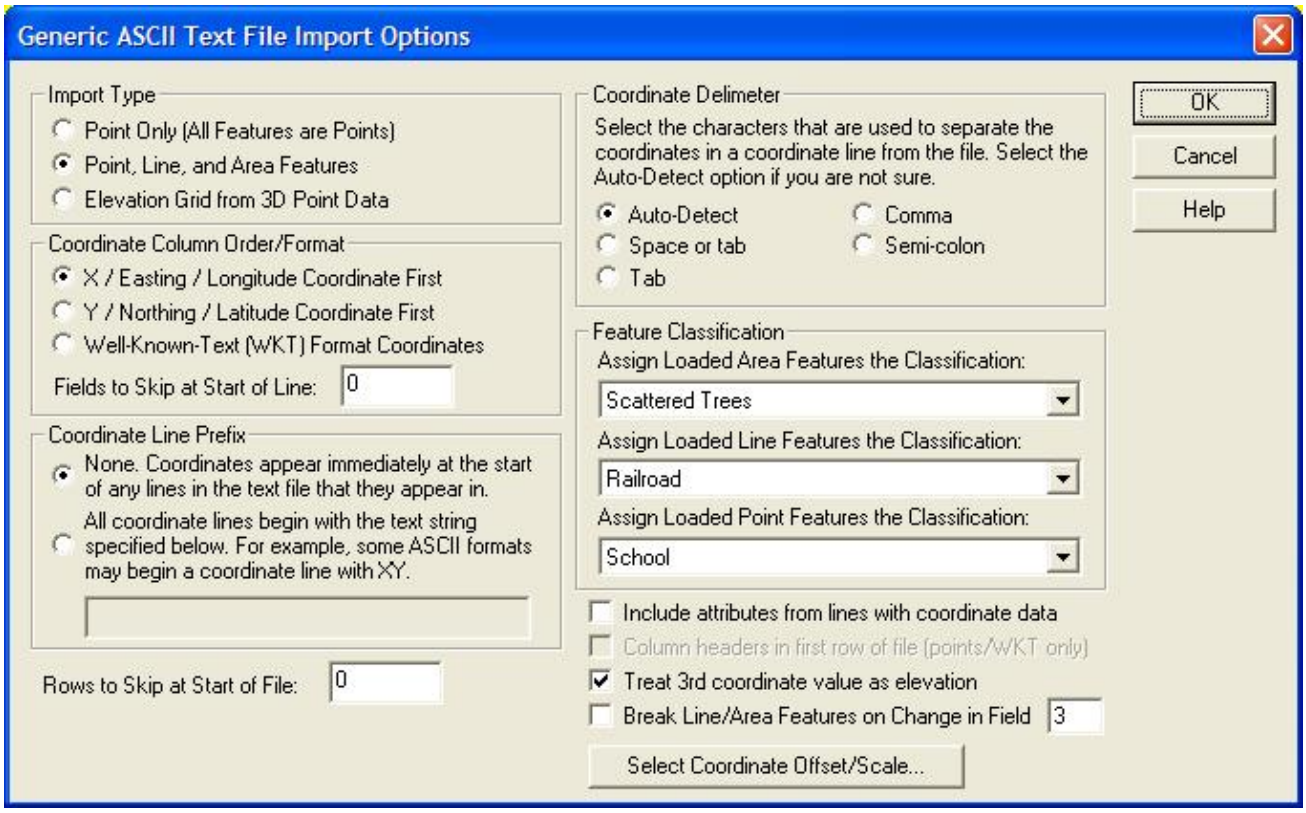
Note: Global Mapper automatically opens files with tar.gz extensions without the use of a decompression tool such as Winzip. This is particularly useful for SDTS transfers, which are typically distributed in a .tar.gz format.

Open Generic ASCII Text File(s) Command

The Open Generic ASCII Text File(s) command allows the user to import data from a wide variety of generic ASCII text formats.

Selecting the Open Generic ASCII Text File command prompts the user to select the file(s) to load and then displays the *Generic ASCII Text Import Options* dialog (pictured below). This dialog allows the user to specify how the text file(s) are formatted so that they can be imported.

Global Mapper supports coordinates in decimal format as well as degree/minute and degree/minute/second coordinates.


Generic ASCII Text File Import Options
Import Type
Point Only (All Features are Points)
Point, Line, and Area Features
Elevation Grid from 3D Point Data
Coordinate Column Order/Format
X / Easting / Longitude Coordinate First
Y / Northing / Latitude Coordinate First
Well-Known-Text (WKT) Format Coordinates
Fields to Skip at Start of Line: 0
Coordinate Line Prefix
None. Coordinates appear immediately at the start of any lines in the text file that they appear in.
All coordinate lines begin with the text string specified below. For example, some ASCII formats may begin a coordinate line with XY.
Rows to Skip at Start of File: 0
Coordinate Delimeter
Select the characters that are used to separate the coordinates in a coordinate line from the file. Select the Auto-Detect option if you are not sure.
Auto-Detect
Comma
Space or tab
Semi-colon
Tab
Feature Classification
Assign Loaded Area Features the Classification:
Scattered Trees
Assign Loaded Line Features the Classification:
Railroad
Assign Loaded Point Features the Classification:
School
Include attributes from lines with coordinate data
Column headers in first row of file (points/WKT only)
Treat 3rd coordinate value as elevation
Break Line/Area Features on Change in Field 3
Select Coordinate Offset/Scale...
OK
Cancel
Help

The *Import Type* section allows the user to specify how they want the data in the file to be treated. The different import types are defined as follows:

- *Point Only* - All lines from the file which are determined to contain coordinate data will result in a single point feature to be generated.
- *Point, Line, and Area Features* - Any string of two or more consecutive lines with coordinate data will result in a line or area feature. All isolated coordinate lines will result in a point feature.

- *Elevation Grid* - All lines from the file which are determined to contain 3D coordinate data will be use generated a triangulated terrain which is then gridded to create a elevation grid. This grid has all the capabilities of an imported DEM, including contour generation, line of sight and view shed analysis, and raster draping. When selecting this option, the Create Elevation Grid dialog will appear after setting up the ASCII file import options to allow setting up the gridding process.

The *Coordinate Column Order* section allows the user to specify in what order the coordinates are found on coordinate lines in the file. Coordinates can either be x followed by y (i.e. longitude then latitude) or the reverse. Elevation values, if any, are always assumed to come after the x and y values. The *Fields to Skip at Start of Line* setting controls what field index (column) the coordinates start in. For example, if the x and y coordinates are in the 3rd and 4th columns, set this value to 2 so that the coordinates will be grabbed from the appropriate place.

The *Coordinate Delimeter* section allows the user to specify what character the coordinates are separated by on coordinate lines. If the *Auto-Detect* option is selected, Global Mapper will attempt to automatically determine the coordinate delimeter. This option will usually work and should probably be used unless you have trouble.

The *Coordinate Line Prefix* section allows the user to specify whether coordinates start at the beginning of the line or if coordinate lines start with some other sequence of characters. For example, some formats may start coordinate lines with the sequence "XY,".

The *Rows to Skip at Start of File* setting controls how many lines to skip at the start of the file before trying to extract data. This is useful if you have some header lines at the start of your file that you want to skip over.

The *Feature Classification* section allows the user to specify what feature type to assign to area, line, and point features imported from the file.

If the *Include attributes from lines with coordinate data* option is selected, any text found AFTER the coordinate data on a line from the file will be including as attribute for the feature that coordinate is in. If not selected, only lines from the file that are not determined to contain coordinate data will be used as attributes.

If you are doing a Point Only import and the *Column Headers in First Row of File* option is checked, values in the first line from the file will be used at the names of attributes for attributes found in coordinate data lines. This is useful for things like CSV files.

If the *Treat 3rd coordinate value as elevation* option is selected and a numeric value is found immediately following the x and y (or lat and lon) coordinate values, that value will be treated as an elevation. Otherwise, the value will be included as an attribute if the *Include attributes from lines with coordinate data* option is selected. Typically you want to leave this option checked unless you are importing point data in which the 3rd column is an attribute that occasionally contains all numeric values, such as well names.

If you have line and/or area data that do not have non-coordinate lines separating them but rather are delimited by a change in a particular field/column of data, you can use the *Break Line/Area Features on Change in Field* option to specify which field (use a 1-based index) to check for breaking the data into separate line/area features.

Pressing the *Select Coordinate Offset/Scale* button displays a dialog that allows the user to select an offset and scale factor to apply to each coordinate. The offset entered will first be added to each coordinate, and then each coordinate will be multiplied by the scale factor.

When generic ASCII text files are imported, Global Mapper will scan the attributes associated with each feature and look for any attribute names that are known to it. The following is an abbreviated list of attribute names that are currently recognized by Global Mapper when generic ASCII text files are read (see the links below the list for more complete lists):

- NAME or LABEL - the value associated with an attribute of either of these names will be used as the feature name.
- DESC, DESCRIPTION, LAYER, or TYPE - the value associated with an attribute of any of these names will be used as the feature description.
- GM_TYPE - the value associated with an attribute with this name or any of the description names listed above will be used to attempt to assign a classification other than the default for each feature. The value must match one of the classification names in Global Mapper to work. It will also work for user-created custom types.
- ELEVATION, HEIGHT, or DEPTH - the value associated with an attribute of any of these names will be used as the feature's elevation.
- SYMBOL, POINT SYMBOL, or POINT_SYMBOL - the values associated with an attribute of any of these names will be compared against the names of the symbols available in Global Mapper (including any custom symbols). If a match is found, that symbol will be used for the point feature. These attribute names are ignored for line features. You can also specify custom dot and square symbol colors and sizes without having to add your own custom bitmaps for those symbols. Use names of the form DOT_CUSTOM_[SIZE]_[RED]_[GREEN]_[BLUE] and SQUARE_CUSTOM_[SIZE]_[RED]_[GREEN]_[BLUE] where the [SIZE] value is the radius in pixels of the dot or square, and the [RED], [GREEN], and [BLUE] values represent the color to use. For example, to specify a dot symbol of radius 10 pixels with a color or green, you would use a symbol name of DOT_CUSTOM_10_0_255_0.
- COLOR - the COLOR attribute should be formatted as RGB(red,green,blue). In the absence of a specific fill or line color, it will be used.
- LINE COLOR, LINE_COLOR, BORDER COLOR, BORDER_COLOR, PEN COLOR, or PEN_COLOR - the values associated with an attribute of any of these names will be used as the color for the pen used to draw line features. The values must be formatted according to the guidelines layed out for the COLOR attribute in order to be recognized.
- LINE WIDTH, LINE_WIDTH, BORDER WIDTH, BORDER_WIDTH, PEN WIDTH, or PEN_WIDTH - the values associated with an attribute of any of these names will be used as the width for the pen used to draw line features.
- LINE STYLE, LINE_STYLE, BORDER STYLE, BORDER_STYLE, PEN STYLE, or PEN_STYLE - the values associated with an attribute of any of these names will be used as the style for the pen used to draw line features. Valid values are Solid, Dash, Dot, Dash - Dot, Dash - Dot - Dot, and Null. Only the Solid value is valid for lines with a width greater than 1
- LABEL_ON_LINE - if this is set to "YES" or "TRUE", the label (if any) for this line feature should be rendered centered on the line
- CLOSED - if this is set to "YES" or "TRUE", the feature will be treated as a closed area feature if it has at least three vertices.
- ISLAND - if this is set to "YES" or "TRUE", the feature will be treated as an island of the previous closed parent area feature if it has at least three vertices. If there are no previous parent areas, this attribute will be ignored.
- FONT_NAME - specifies the name (e.g. Arial, Times New Roman, etc.) of the font to use when displaying the display label, if any, for this feature.
- FONT_COLOR - specifies the color of the font to use when displaying the display label, if any, for this feature. The values must be formatted according to the guidelines layed out for the COLOR attribute in order to be recognized.

- FONT_ANGLE - specifies the angle in degrees of the font to use when displaying the display label, if any, for this point feature.
- FONT_SIZE - specifies the point size of the font to use when displaying the display label, if any, for this feature.
- FONT_HEIGHT_METERS - specifies the height in meters of the font to use when displaying the display label, if any, for this feature. Using this causes the actual point size of the font to vary as you zoom in and out.
- FONT_CHARSET - specifies the numeric character set of the font to use when displaying the display label, if any, for this feature. These correspond to the Windows character set enumeration.

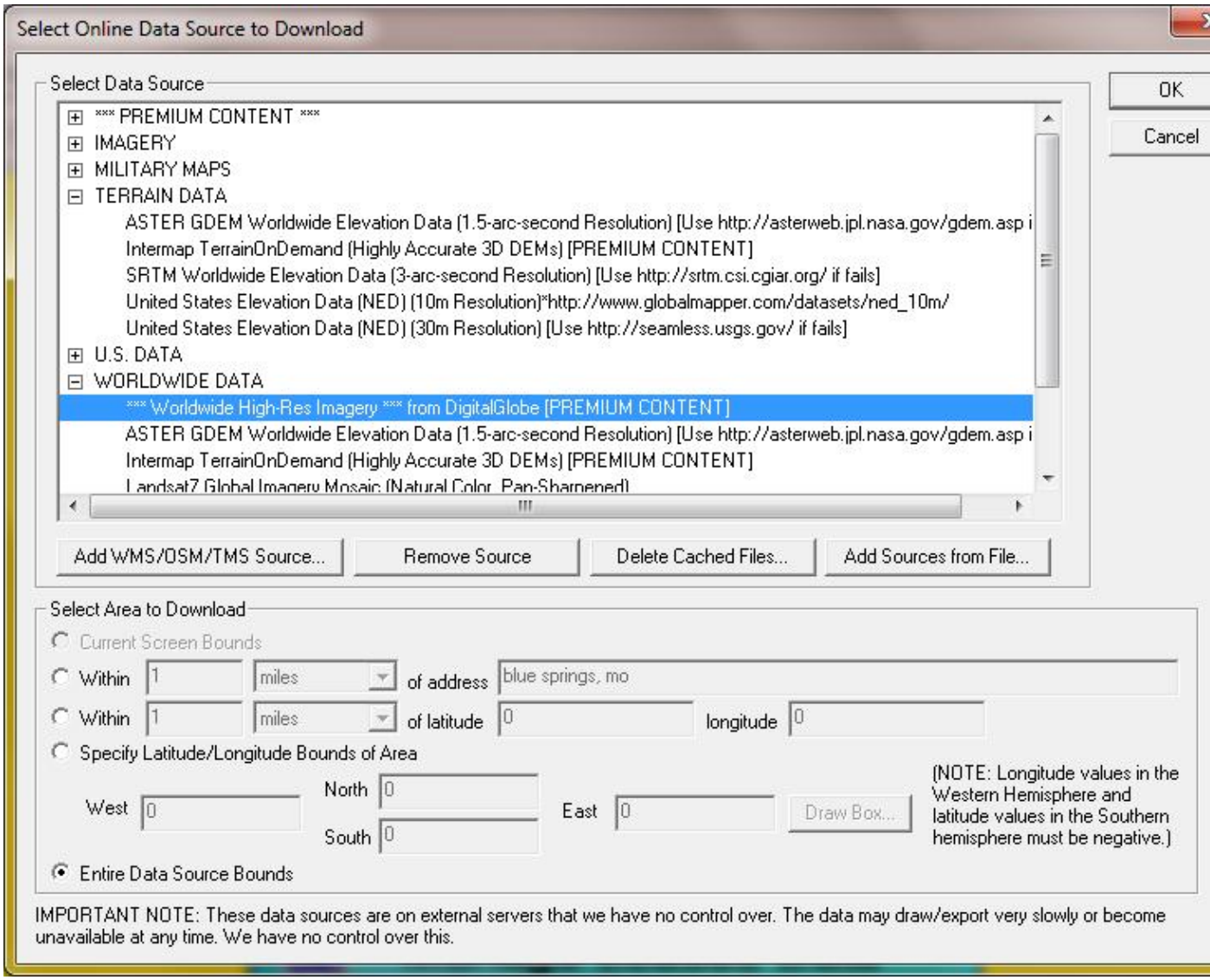
Click here for more instructions on creating generic ASCII data files with features of various types and click here for more documentation on the supported fields.

Download Online Imagery/Topo/Terrain Maps

The Download Online Imagery/Topo/Terrain Maps command allows the user to download mapping data from numerous built-in and user-supplied sources. This includes premium access to high resolution color imagery for the entire world from DigitalGlobe, worldwide street maps from OpenStreetMap.org, as well as seamless USGS topographic maps and satellite imagery for the entire United States from MSRMaps.com/TerraServer-USA. In addition, access is provided to several built-in WMS (OpenGC Web Map Server) databases to provide easy access to digitial terrain data (NED and SRTM) as well as color satellite imagery (Landsat7) for the entire world. You can also add your own WMS data sources for access to any data published on a WMS server.

This is an extremely powerful feature as it puts many terabytes of usually very expensive data right at your fingertips in Global Mapper for no additional cost (with the exception of access to the un-watermarked DigitalGlobe imagery, which is not free). Note that this feature requires Internet access to work.

When you select the menu command, the *Select Online Data Source to Download* dialog (pictured below) is displayed. This dialog allows you to select the type, or theme, of data to download, as well as the extents of the data to download. You can either select to download the current screen bounds, an area to download around an address, specify a lat/lon bounds explicitly, or select to download the entire data source.


Select Online Data Source to Download
Select Data Source
OK
Cancel
*** PREMIUM CONTENT ***
IMAGERY
MILITARY MAPS
TERRAIN DATA
ASTER GDEM Worldwide Elevation Data (1.5-arc-second Resolution) [Use http://asterweb.jpl.nasa.gov/gdem.asp i
Intermap TerrainOnDemand (Highly Accurate 3D DEMs) [PREMIUM CONTENT]
SRTM Worldwide Elevation Data (3-arc-second Resolution) [Use http://srtm.csi.cgiar.org/ if fails]
United States Elevation Data (NED) (10m Resolution)*http://www.globalmapper.com/datasets/ned_10m/
United States Elevation Data (NED) (30m Resolution) [Use http://seamless.usgs.gov/ if fails]
U.S. DATA
WORLDWIDE DATA
*** Worldwide High-Res Imagery *** from DigitalGlobe [PREMIUM CONTENT]
ASTER GDEM Worldwide Elevation Data (1.5-arc-second Resolution) [Use http://asterweb.jpl.nasa.gov/gdem.asp i
Intermap TerrainOnDemand (Highly Accurate 3D DEMs) [PREMIUM CONTENT]
Landsat7 Global Imagery Mosaic (Natural Color, Pan-Sharpened)
Add WMS/OSM/TMS Source...
Remove Source
Delete Cached Files...
Add Sources from File...
Select Area to Download
Current Screen Bounds
Within 1 miles of address blue springs, mo
Within 1 miles of latitude 0 longitude 0
Specify Latitude/Longitude Bounds of Area
West 0
North 0
South 0
East 0
Draw Box...
(NOTE: Longitude values in the Western Hemisphere and latitude values in the Southern hemisphere must be negative.)
Entire Data Source Bounds
IMPORTANT NOTE: These data sources are on external servers that we have no control over. The data may draw/export very slowly or become unavailable at any time. We have no control over this.

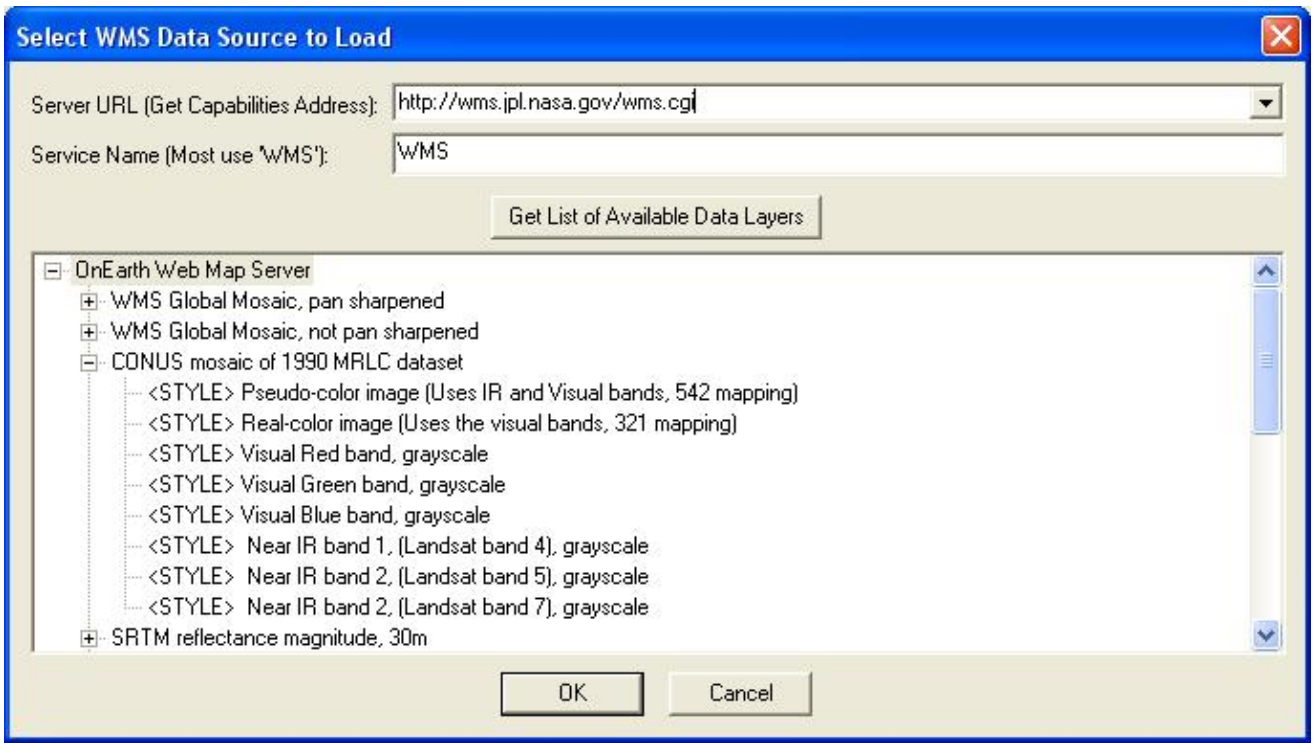
Once the data to download is defined, Global Mapper will automatically download the most appropriate layer for display as you zoom in and out. This way, you can see an overview of the data when zoomed out, with more detail becoming available when you zoom in. You can also export this data in full resolution to any of the supported raster export formats, such as GeoTIFF, JPG, or ECW. The most appropriate detail level for the export sample spacing will be used to obtain the source data for the export.

Each data source load will appear as a separate layer in the Overlay Control Center. Each entry can have it's display options modified just like any other raster layer to drape it over elevation data, blend it with other layers, etc.

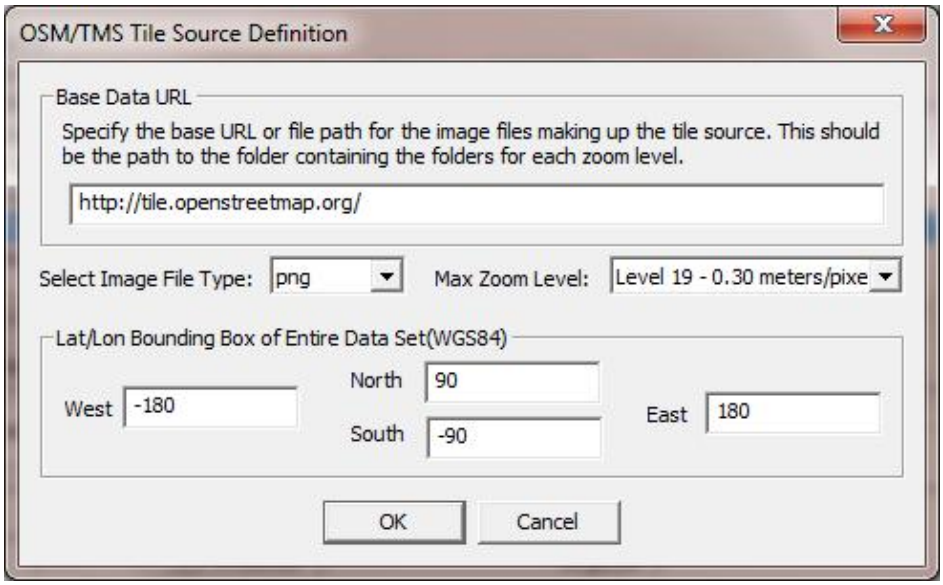
You can use the Add New Source button to add new online sources of imagery from WMS (Web Map Service), WCE (Web Coverage Service), OSM (OpenStreetMap Tiles), Google Maps-organized tiles or TMS (Tile Map Service) sources. When you press the button a dialog appears allowing you to choose the type of source to add. If you select the WMS or WCS option then the *Select WMS Data Source to Load* dialog (pictured below) is displayed. This dialog allows you to specify the URL of a WMS or WCS data source and select what layer(s) to add as an available data source on the *Select Online Data Source to Download* dialog. The URL that you should specify is the GetCapabilities URL, such as http://wms.jpl.nasa.gov/wms.cgi for the

JPL WMS data server. Once you've entered the URL, press the Get List of Available Data Layers button to query the server and populate the data control with the available data layers on that server. Then simply select the data layer and style that you want and press OK to have it added to the available data source list. Once a source is added, you can use the Remove Source button to remove it from the list of available data sources at a later time. If you need to specify additional options for the WMS server, such as forcing a particular image format to be used, add those parameters after the Service Name parameter. For example, to force the use of the JPG format, you might specify a Service Name parameter of 'WMS&format=image/jpeg'. To force a particular projection that the server supports to be used, include a SRS parameter, like 'WMS&SRS=EPSG:26905' to force the use of the UTM projection with the NAD83 datum and zone 5N.

You can also right-click on the added WMS layer in the list of sources and set a maximum zoom level (in meters per pixel) for the layer. For example you can specify a maximum zoom level of 5.0 meters per pixel, so when loading data from the source no tiles with a resolution greater than 5.0 meters per pixel will be downloaded. This is useful for sources that don't specify themselves what the maximum resolution should be and just go blank when you overzoom them.


Select WMS Data Source to Load
Server URL (Get Capabilities Address):
http://wms.jpl.nasa.gov/wms.cgi
Service Name (Most use 'WMS'):
WMS
Get List of Available Data Layers
OnEarth Web Map Server
WMS Global Mosaic, pan sharpened
WMS Global Mosaic, not pan sharpened
CONUS mosaic of 1990 MRLC dataset
<STYLE> Pseudo-color image (Uses IR and Visual bands, 542 mapping)
<STYLE> Real-color image (Uses the visual bands, 321 mapping)
<STYLE> Visual Red band, grayscale
<STYLE> Visual Green band, grayscale
<STYLE> Visual Blue band, grayscale
<STYLE> Near IR band 1, (Landsat band 4), grayscale
<STYLE> Near IR band 2, (Landsat band 5), grayscale
<STYLE> Near IR band 2, (Landsat band 7), grayscale
SRTM reflectance magnitude, 30m
OK
Cancel

If you choose the OSM, Google Maps, or TMS source type, then the *OSM/TMS Tile Source Defintion* dialog (pictured below) is displayed, allowing you to setup the source. You need to specify the base URL where the data for the tiled source can be found (this should be the folder under which the folders for each zoom level are stored). In addition you can select whether the source uses PNG or JPG image files and the maximum zoom level and bounds of the data source.



You can also use the Delete Cached Files button to remove any locally cached files from any particular type of data sources. This is useful if the online data may have changed or if you have downloaded corrupt files somehow.

The Add Sources From File button allows you to add new WMS sources from an external text file. This provides an easy way to share your list of WMS sources with other users. You can simply provide them with your wms_user_sources.txt file from your Application Data folder (see the Help->About dialog for the location of this folder) and they can load that file with this button to add their sources to your source list.

Open All Files in a Directory Tree Command

The Open All Files in a Directory Tree command allows the user to open all of the files matching a user-specified filename mask under a user-selected directory. You will first be prompted to select a folder from which to load the files. After selecting the folder, you will be prompted to enter a filename mask for all of the files that you would like to attempt to load. After selecting a filename mask, all files under the selected folder which match the filename mask and are recognized by Global Mapper as a known data type will be loaded.

The filename mask supports the * and ? wildcard characters. The default mask of * will check all files under the selected folder. You can also cause data to only be loaded from selected folders as well. For example, if you had a large collection of folders with data split up into 1x1 degree blocks with the folder names depecting the 1x1 degree block they held, you could use a directory name mask to load only those blocks that you wanted. For example, you might use a mask of *N4?W10?*.tif* to load all TIFF files between N40 and N50 and W110 and W100.

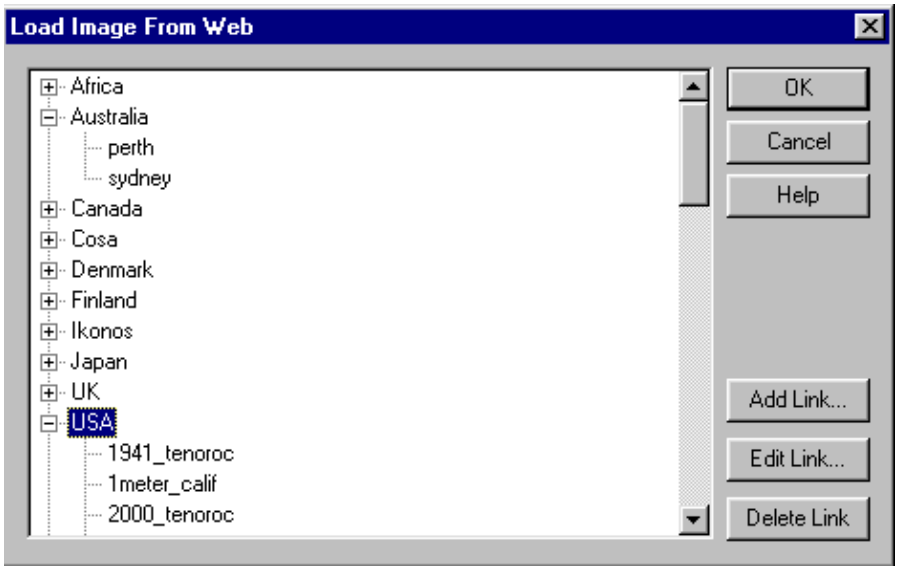
You can also specify multiple masks if you need more than one to describe the set of files that you would like to load. Simply separate the masks with a space.

Open ECW File from the Web Command

The Open ECW File from the Web command allows the user to open an ER Mapper Compressed Wavelet (ECW) image file directly from an Image Web Server URL. While these files may be terabytes in actual size,

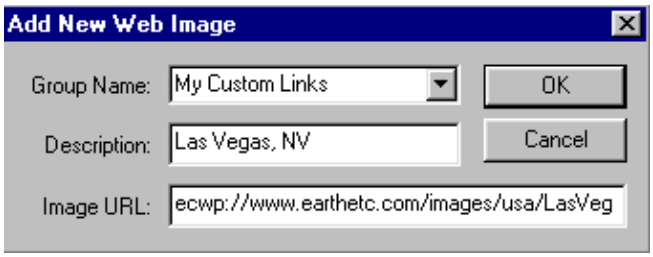
only the portion needed for the current display window is downloaded, allowing for the browsing of extremely large data sets.

Selecting the Open ECW File from the Web command displays the *Load Image From Web* dialog (pictured below). This dialog allows the user to either select a predefined web link for loading or to enter the URL of any available ECW file served by Image Web Server.



The tree on the left of the dialog allows the user to select which data file they wish to load. *Global Mapper* comes with several dozen useful links already entered into the tree.

To access your own ECW image from the web, press the *Add Link...* button. This button causes the *Add New Web Link* dialog (pictured below) to be displayed.



The *Group Name* drop list allows the user to select which group, if any, to place the new link in. Any of the predefined groups can be selected, or a new group name can be entered. Leaving the group name blank will cause the new link to appear at the root level of the tree.

The *Description* field is where you enter the human-readable description of the link. This is what will be displayed for the link on the main dialog. Leaving this blank will cause the URL to be displayed instead.

The *URL* field is the most important piece of this dialog. This is where you specify the address of the ECW file to load. The URL should begin with the prefix *ecwp://* with the remainder being a valid path to an ECW file served using ER Mapper's Image Web Server software.

When you've completed entering information about the new web link, press the *OK* button to complete your entry and have it added to the web link tree in the *Load Image From Web* dialog.

Pressing the *Edit Link...* button allows the user to edit the currently selected web link. Note that the built-in web links cannot be edited.

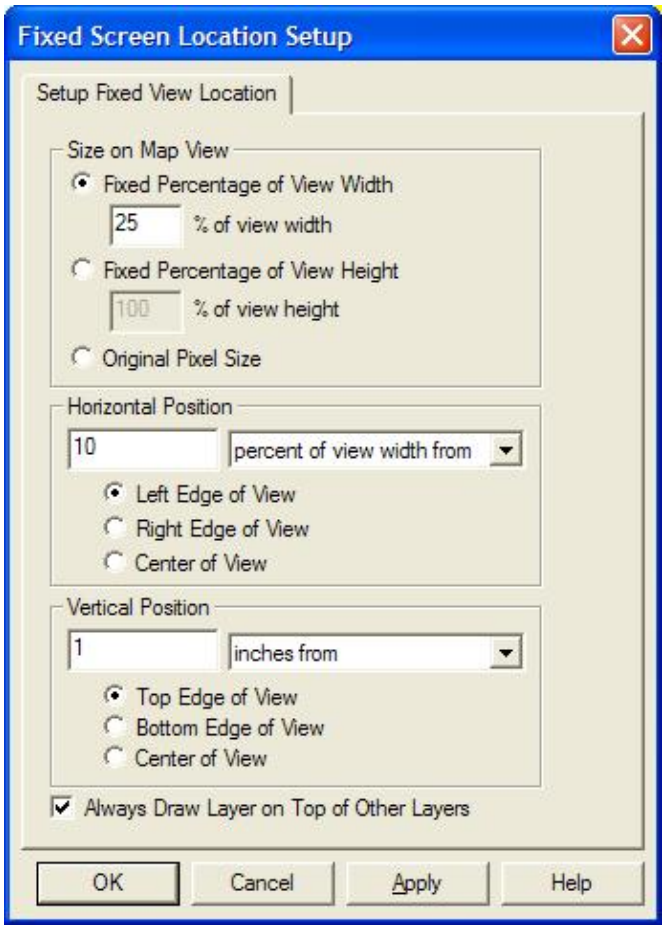
Pressing the *Delete Link...* button will delete the currently selected web link or group from the web link tree.

If you get an error message indicating that your settings have been updated to support the ECWP protocol whenever you try to load an ECW layer from the web you need to download and install the latest ECW ActiveX plugin from http://demo.ermapper.com/ecwplugins/DownloadIEPlugin.htm.

Open Data File at Fixed Screen Location

The Open Data File at Fixed Screen Location command allows the user to open any supported data file format for display at a fixed location on the screen rather than at a fixed location on the earth. This is particularly useful for loading things like bitmaps for legends and logos. The loaded data will be used for screen display, export, and printing operations.

Selecting the Open Data File at Fixed Screen Location command first prompts you to select a file to load, then displays the *Fixed Screen Location Setup* dialog (pictured below). This dialog allows the user to specify the size and position of the data relative to the screen/export/printout.



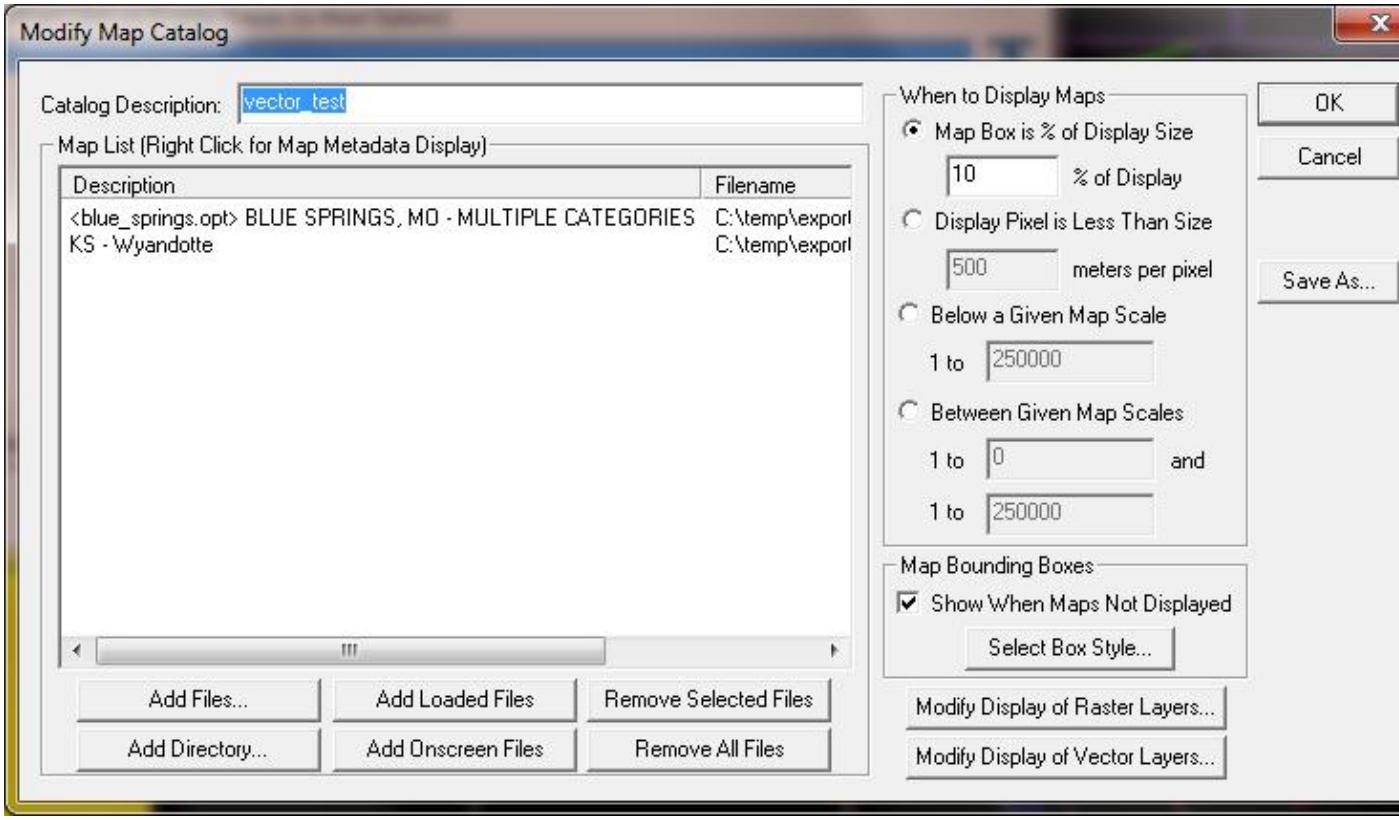
Unload All Command

The Unload All command unloads all overlays and clears the screen.

Create New Map Catalog Command

The Create New Map Catalog command allows you to create a "map catalog". A "map catalog" is a collection of map files which are grouped together to allow for easy loading, viewing, and export. Layers in a map catalog will be loaded and unloaded as needed for display and export, potentially greatly reducing the load time and memory requirements for working with very large collections of data.

Upon selecting this command and selecting the file to save the map catalog to, the *Modify Map Catalog* dialog (shown below) will be displayed, allowing you to add files to the catalog, control at what zoom level data layers are loaded for display, and setup how the map bounding boxes are displayed when you are zoomed out too far for the actual map data to display. By default map bounding boxes are displayed using the style set for the *Map Catalog Layer Bounds* type.



You can obtain metadata and projection information about layers in the map catalog by right-clicking on them in the Map List and selecting the appropriate option.

You can modify map catalogs again after loading them by opening the *Overlay Control Center*, selecting the map catalog layer, then pressing the Options button.

Note: Only registered users of Global Mapper are able to create map catalogs.

Load Workspace Command

The Load Workspace command allows the user to load a Global Mapper workspace file (.gsw) previously saved with the Save Workspace command.

Note: Only registered users of Global Mapper are able to load Global Mapper workspace files.

Save Workspace Command

The Save Workspace command allows the user to save their current set of loaded overlays to a Global Mapper workspace file for later loading with the Load Workspace command.

The Global Mapper workspace maintains the list of all currently loaded overlays as well as some state information about each of those overlays. When the workspace file is loaded, all of the overlays that were loaded at the time the workspace file was saved will be loaded into Global Mapper. This provides a handy way to easily load a group of overlays which you work with often.

The Global Mapper workspace will also contain any changes that you have made to loaded vector features as well as any new vector features that you have created. The user projection and last view on the data will also be maintained.

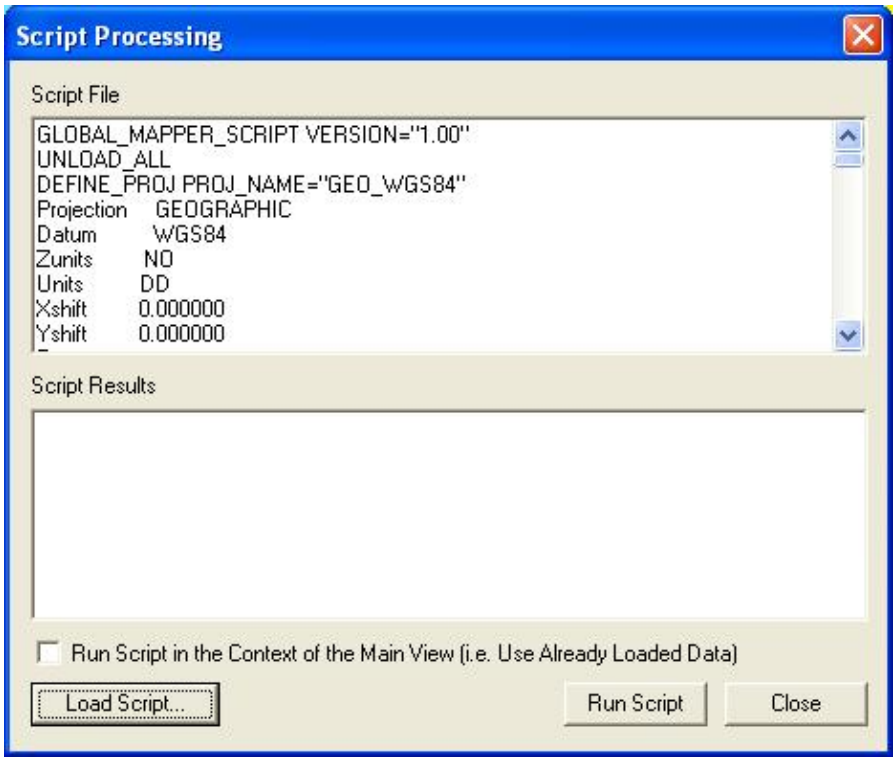
Find Data Online Command

Selecting the Find Data Online command will open a web browser pointing to places on the internet where data compatible with Global Mapper is available for download.

Run Script Command

The Run Script command allows users to run a Global Mapper script file that they have created. This is a powerful option that allows the user to automate a wide variety of tasks. Click here for a guide to the scripting language.

Selecting the Run Script command from the menu displays the *Script Processing* dialog, shown here.



The *Script File* pane displays the currently loaded script file. To load a new script file for processing, press the *Load Script...* button at the bottom left corner of the dialog.

If you would like the script file to make use of data already loaded in the main view and to also affect what is displayed in the main view, check the *Run Script in the Context of the Main View* option prior to running the script.

To run the loaded script file, press the *Run Script* button. Any warning, error, or status messages generated while running the script will be output to the *Script Results* pane.

When you are done processing scripts, press the *Cancel* button to close the dialog.

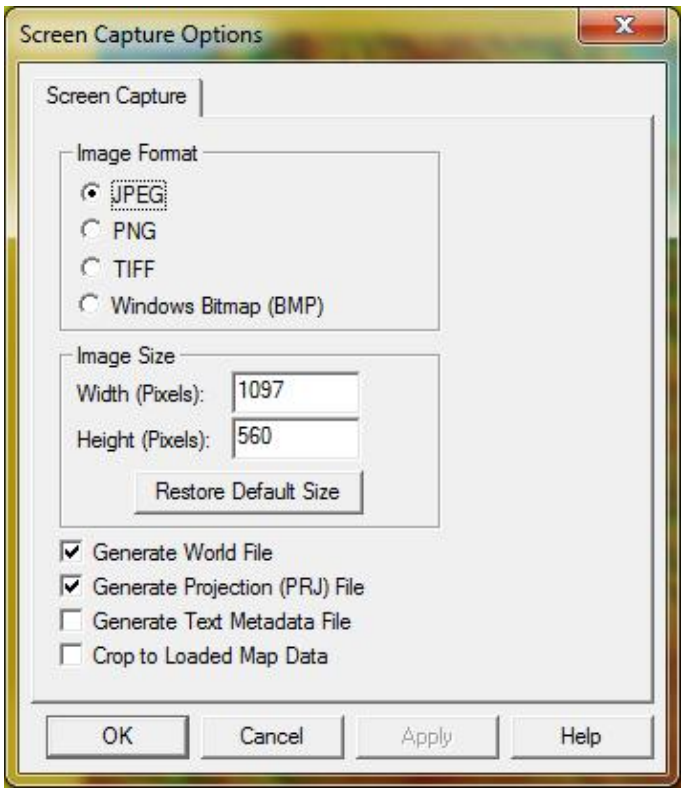
Note: Only registered users of Global Mapper are able to run Global Mapper script files.

Capture Screen Contents to Image Command

The Capture Screen Contents to Image command allows user to save the current contents of the Global Mapper window to a JPEG, PNG, (Geo)TIFF, or Windows Bitmap (BMP) file. In addition, the generated image can be generated in a higher resolution than the screen to provide greater fidelity. Also, a world file for georeferencing in other software packages as well as a projection (PRJ) file describing the native ground reference system of the image can be optionally generated as well.

Unlike the raster export commands described later, the Capture Screen Contents to Image command also saves any vector overlays drawn to the screen.

Selecting the Capture Screen Contents to Image command from the menu displays the *Screen Capture Options* dialog, shown here.



The *Image Format* section allows the user to select the format of the image to generate. Different formats have their own unique strenghts and weaknesses which make choosing the best format vary depending on the desired end results. The supported formats are:

- *JPEG* - JPEG is a lossy format that achieves excellent compression on images with a lot of color variation, such as pictures of real world objects and shaded elevation data.
- *PNG (Portable Network Graphic)* - PNG is a lossless format that achieves excellent compression on images without a lot of color variation, such as line (vector) drawings and paper map scans such as DRGs. The generated PNG file will be of the 24-bit variety.
- *(Geo)TIFF* - TIFF is a lossless format that is supported by many GIS packages. Saving the screen to a TIFF with this command generated a 24-bit uncompressed TIFF. In addition, all georeferencing data is stored in a GeoTIFF header attached to the TIFF, making the image completely self-describing.
- *Windows Bitmap (BMP)* - BMP is a widely support format on Windows platforms. Saving the screen to a BMP results in a 24-bit uncompressed image.

The width and height of the generated image in pixels are specified in the *Image Size* panel. By default, the size of the Global Mapper view pane are used. Using these values will generate an image that exactly matches what you see. You can change these values to generate a more or less resolute image with the obvious tradeoff of size vs. quality.

Checking the *Generate World File* option results in a world file being generated in addition to the image. The world file will be generated in the same directory as the image and will have the same primary name as the image. The filename extension will depend on the selected image type (JPEG=.jpgw, PNG=.pngw, TIFF=.tfw,BMP=.bmpw).

Checking the *Generate Projection (PRJ) File* option results in a projection file being generated describing the ground reference system of the created image. The projection file will be generated in the same directory as the image and will have the same primary name as the image with an extension of .prj.

Checking the *Generate Text Metadata File* option results in a text file being generated listing the metadata for the captured image.

Checking the *Crop to Loaded Map Data* option results in a text file being generated that is cropped to the bounds of your currently loaded map data rather than the full screen extents. If the loaded map data does not take up at least the entire screen then your specified pixel dimensions will also be shrunk so that the pixel size remains the same.

Pressing the *OK* button prompts the user to select the name and location of the image to generate and then proceeds to generate the image.

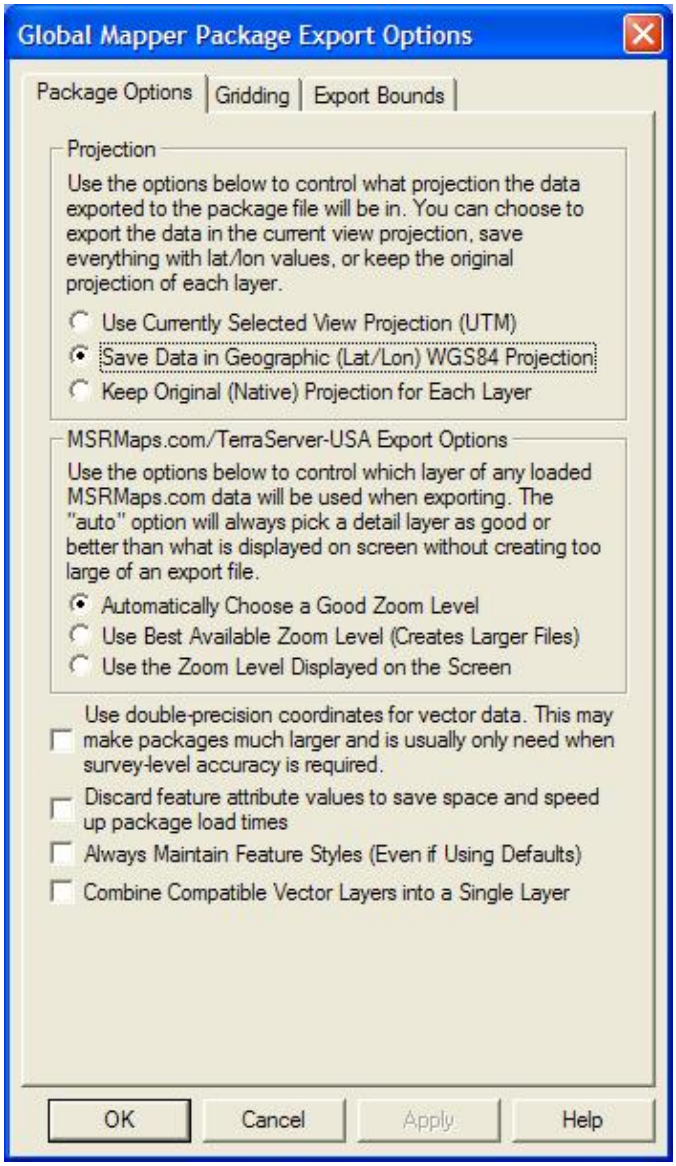
Note: Only registered users of Global Mapper are able capture the screen to an image file.

Export Global Mapper Package File Command

The Export Global Mapper Package File command allows the user to export any or all of the loaded data to a Global Mapper package file. These files are similar to workspace files except that the actual data is stored in the files. Package files provide an easy way to pass around lots of data between Global Mapper users on different computers with a single self-contained file.

When selected, the command displays the *Global Mapper Package Export Options* dialog which allows the user to setup the package export. The dialog consists of a *Package Options* panel, a *Simplification* panel, a

Gridding panel, and an *Export Bounds* panel.


Global Mapper Package Export Options
Package Options
Gridding
Export Bounds
Projection
Use the options below to control what projection the data exported to the package file will be in. You can choose to export the data in the current view projection, save everything with lat/lon values, or keep the original projection of each layer.
Use Currently Selected View Projection (UTM)
Save Data in Geographic (Lat/Lon) WGS84 Projection
Keep Original (Native) Projection for Each Layer
MSRMaps.com/TerraServer-USA Export Options
Use the options below to control which layer of any loaded MSRMaps.com data will be used when exporting. The "auto" option will always pick a detail layer as good or better than what is displayed on screen without creating too large of an export file.
Automatically Choose a Good Zoom Level
Use Best Available Zoom Level (Creates Larger Files)
Use the Zoom Level Displayed on the Screen
Use double-precision coordinates for vector data. This may make packages much larger and is usually only need when survey-level accuracy is required.
Discard feature attribute values to save space and speed up package load times
Always Maintain Feature Styles (Even if Using Defaults)
Combine Compatible Vector Layers into a Single Layer
OK
Cancel
Apply
Help

The *Package Options* panel consists of options allowing the user to select the projection to save the data in, how to handle dynamically streamed MSRMaps.com/TerraServer-USA data, and other options. These include the *Always Maintain Feature Styles* option, which specifies that any vector features stored in the package file should explicitly save the styling of that feature, even if they are using the default style for the feature classification. This can make it easier to maintain exact styling when transferring packages between Global Mapper installations.

In the *Projection* section of the panel, the user can choose to save all loaded data in the currently selected view projection (this is the projection selected on the Projection tab of the Configuration dialog), in latitude/longitude coordinates (the "Geographic" projection) with the WGS84 datum, or to keep each layer in its original native projection.

In the *TerraServer Export Options* section of the panel, the user can select how displayed layers from the Download TerraServer menu option are exported. The *Automatic* selection for imagery themes (i.e. DOQs, Urban Area imagery) will save data slightly more detailed than what is displayed on the screen. For the DRG

(topographic map) theme, the most detailed zoom range for the current scale of DRG map being displayed (i.e. 24K, 100K, 250K) will be determined and data from that scale will be saved. The other alternatives either save the most detailed scale available, creating potentially very large files, or the scale the most closely matches the current display scale on the screen.

The *Combine Compatible Vector Layers into a Single Layer* option causes all vector features with the same native projection to be combined into a single layer within the package file rather than maintaining their original layer structure.

The *Simplification* panel allows the user to set up the threshold at which points that don't contribute much to the shape of the vector line and area features being exported are removed in order to generate features with less vertices. By default, all vertices will be kept, but the user can move the slider to the right to get rid of relatively insignificant vertices and realize significant space spacings at the cost of some fidelity.

The Gridding panel allows the user to split up the data into regularly spaced tiles on export if desired rather than just exporting a single file.

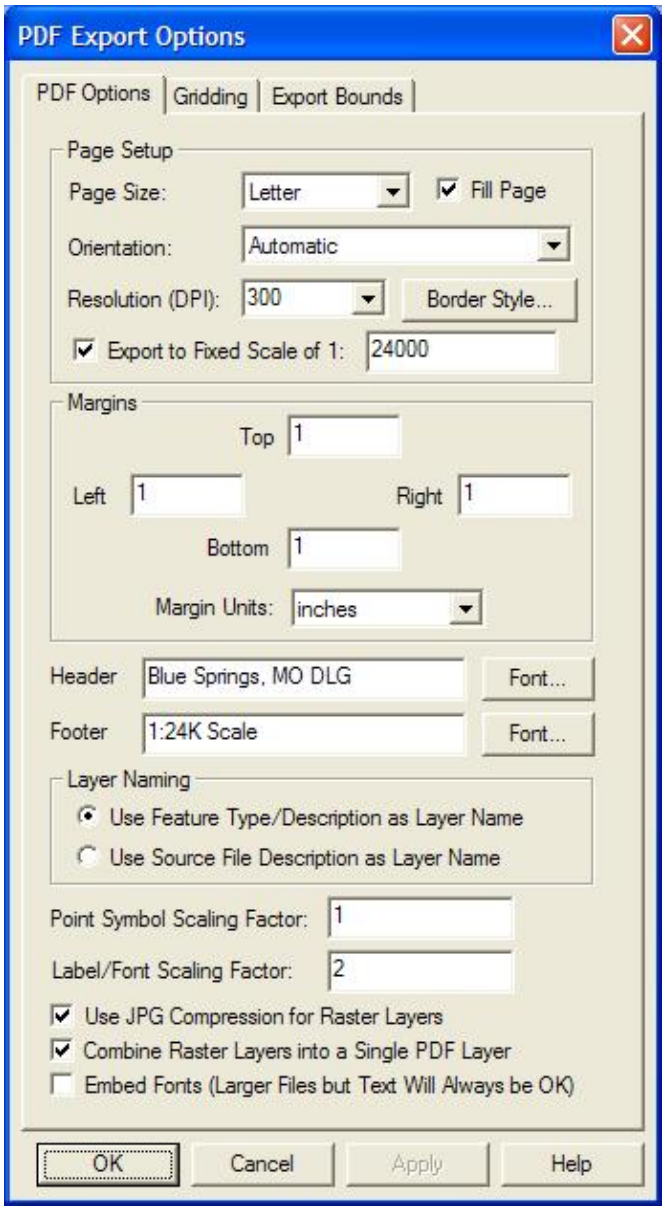
The Export Bounds panel allows the user to select what portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able capture the screen to an image file.

Export PDF/GeoPDF File Command

The Export PDF File command allows the user to export any or all of the loaded data to a Geo-enabled PDF file. These are standard PDF files that can be read in Adobe Acrobat Reader. They also will have geopositioning information embedded in them so that mapping applications like Global Mapper can automatically display the data in the PDF at the proper location.

When selected, the command displays the *PDF Export Options* dialog which allows the user to setup the PDF export. The dialog consists of a *PDF Options* panel, a *Gridding* panel, and an *Export Bounds* panel.



The *PDF Options* tab allows the user to setup the PDF-specific export options. The following sections are available:

- **Page Setup**
  - *Page Size* - The page size setting controls the target paper size for the export
  - *Orientation* - This setting controls whether the target page uses landscape or portrait orientation
  - *Fill Page* - If checked, your specified export bounds will be expanded to fill the entire page if necessary. If you do not check this option, only your exact export bounds will be exported with the rest of the page remaining blank.
  - *Resolution (DPI)* - This setting controls the resolution (dots-per-inch) of your output. Larger values result in more detail being stored in the created PDF file, although the resulting file will also be larger.
  - *Border Style* - Pressing this button brings up a dialog allowing you to setup the style of the border line drawn around your data

    - ♦ *Export to Fixed Scale* - If you choose the option to export to a particular scale, the generated PDF file will have the specified scale. The specified export bounds will be adjusted around the selected center point to have the scale specified.
- **Margins** - This section allows you to setup the size of the white margins around your data
- **Header** - Allows you to specify a header text to draw in the top margin of the output file.
- **Footer** - Allows you to specify a footer text to draw in the bottom margin of the output file.
- **Layer Naming** - This section controls how layers in the created PDF will be named. You can access PDF layers in the Acrobat Reader
    - ♦ *Use Feature Type/Description as Layer Name* - The feature type name/description will be used as the layer name in the PDF file.
    - ♦ *Use Source File Description as Layer Name* - The Control Center layer name for the layer that the feature is in will be used as the PDF layer name.
- **Point Symbol Scaling Factor** - Specifies the scaling factor to apply when rendering point symbols to the PDF file. For example, use 2.0 to double the size of your point symbols in the final PDF file, or 0.5 to make them half the size.
- **Label/Font Scaling Factor** - Specifies the size scaling factor to apply when rendering feature labels to the PDF file, allowing you to easily grow or shrink all labels written to the PDF file. For example, use 2.0 to double the size of your labels in the final PDF file, or 0.5 to make them half the size.
- **Use JPG Compression for Raster Layers** - Specifies that any raster layers exported to the PDF will be compressed in the PDF file using JPG compression. While there may be a slight loss in quality by using this option, the resulting files are typically much smaller and in most cases you cannot notice any loss in quality, so it is recommended to use this option.
- **Combine Raster Layers into a Single PDF Layer** - Specifies that if multiple raster or gridded elevation data sets are involved in the export, they will be combined into a single layer in the generated PDF file rather than each staying in a separate layer in the created file. This will result in smaller files, but you won't be able to individually turn different raster files on and off when viewing the PDF file.
- **Embed Fonts** - Specifies that any fonts used that might not be on every system will be embedded in the PDF file. Using this option will basically guarantee that your text will display the same on any system, but unless you are using an unusual font the increase in PDF file size might not be worth it as most users would have your font anyway.

If any of the point features being exported contain an attribute with LINK in the attribute name and a value either pointing to a valid web URL or a local file, then a clickable hot-spot will be embedded in the generated PDF file allowing you to click the location and pull up the web page or file from inside Acrobat Reader.

The Gridding panel allows the user to split up the data into regularly spaced tiles on export if desired rather than just exporting a single file.

The Export Bounds panel allows the user to select what portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able capture the screen to an image file.

Export Raster and Elevation Data

The commands on the Export Raster and Elevation Data submenu allow the user to export loaded raster and elevation data to various formats.

Export Arc ASCII Grid Command

The Export Arc ASCII Grid command allows the user to export any loaded elevation grid data sets to an Arc ASCII Grid format file.

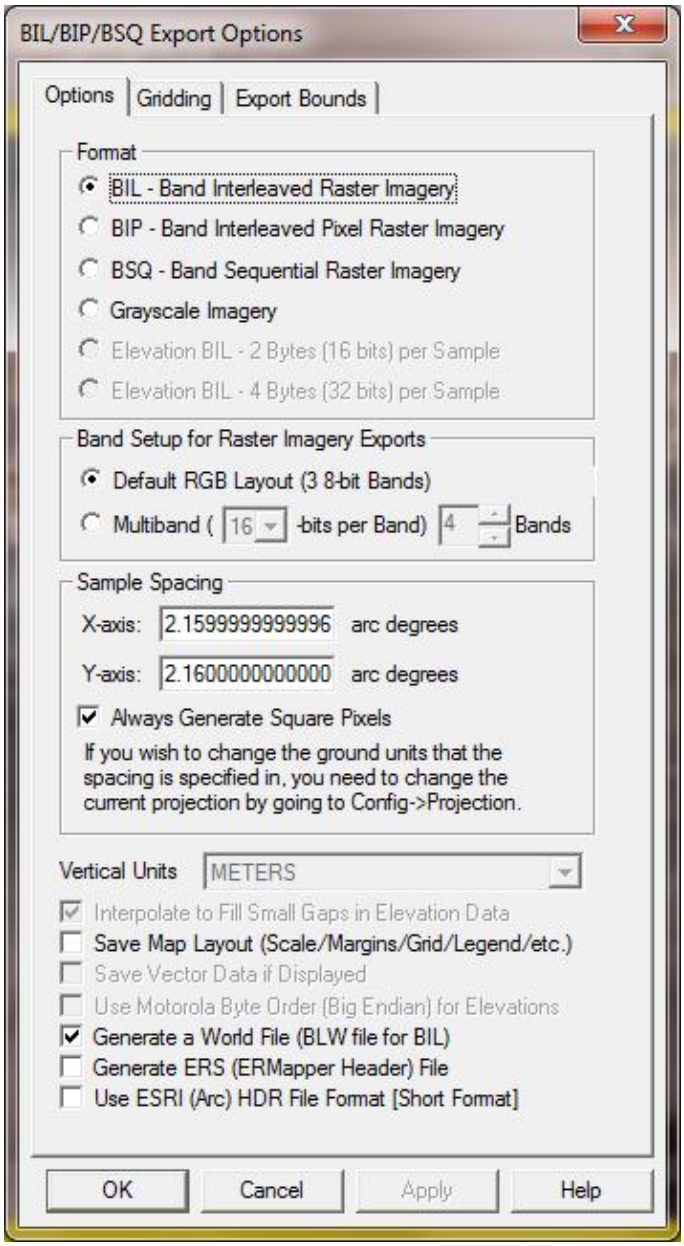
When selected, the command displays the *Arc ASCII Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export BIL/BIP/BSQ Command

The Export BIL/BIP/BSQ command allows the user to export any loaded raster, vector, and/or elevation grid data to a BIL, BIP, or BSQ format file.

When selected, the command displays the *BIL/BIP/BSQ Export Options* dialog which allows the user to setup the export. The dialog consists of an Options panel (pictured below), which allows the user to set up type of export to perform, the sample spacing, vertical units, and other applicable options, a Gridding Panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.


BIL/BIP/BSQ Export Options
Options
Gridding
Export Bounds
Format
BIL - Band Interleaved Raster Imagery
BIP - Band Interleaved Pixel Raster Imagery
BSQ - Band Sequential Raster Imagery
Grayscale Imagery
Elevation BIL - 2 Bytes (16 bits) per Sample
Elevation BIL - 4 Bytes (32 bits) per Sample
Band Setup for Raster Imagery Exports
Default RGB Layout (3 8-bit Bands)
Multiband (16 -bits per Band) 4 Bands
Sample Spacing
X-axis: 2.1599999999996 arc degrees
Y-axis: 2.1600000000000 arc degrees
Always Generate Square Pixels
If you wish to change the ground units that the spacing is specified in, you need to change the current projection by going to Config->Projection.
Vertical Units METERS
Interpolate to Fill Small Gaps in Elevation Data
Save Map Layout (Scale/Margins/Grid/Legend/etc.)
Save Vector Data if Displayed
Use Motorola Byte Order (Big Endian) for Elevations
Generate a World File (BLW file for BIL)
Generate ERS (ERMapper Header) File
Use ESRI (Arc) HDR File Format [Short Format]
OK
Cancel
Apply
Help

Note: Only registered users of Global Mapper are able to export data to any format.

Export BMP Command

The Export BMP command allows the user to export any loaded raster, vector, and elevation grid data sets to a 24-bit RGB BMP file.

When selected, the command displays the *BMP Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the pixel spacing, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export BSB Marine Chart Command

The Export BSB Marine Chart command allows the user to export any loaded raster, vector, and elevation grid data sets to a palette-based (up to 127 colors) BSB marine chart raster image for use in compatible applications and some marine chartplotters. The export will generate a single KAP file containing the chart image.

When selected, the command displays the *BSB Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the pixel spacing and chart parameters, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export BT (Binary Terrain) Command

The Export BT (Binary Terrain) command allows the user to export any loaded elevation grid data sets to a BT (Binary Terrain) format file.

When selected, the command displays the *BT (Binary Terrain) Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing to use, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export DEM Command

The Export DEM command allows the user to export any loaded elevation grid data sets to a native format USGS DEM file.

When selected, the command displays the *DEM Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the quadrangle name, grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export DTED Command

The Export DTED command allows the user to export any loaded elevation grid data sets to native format DTED files. DTED files support a set of fixed resolutions (i.e. DTED levels) which are defined as aligning on particular boundaries. When you select the DTED level to export to and the export bounds, this defines which DTED tiles need to be generated to conform to the DTED standards for that level. The filename that you select for the export is used as a base, with the lat/lon coordinates of the southwest corner of each tile appended to each filename as it is exported. You can also option choose to split up the exports by longitude into separate folders, in which case the longitude is used as a folder name and the latitude appended to your base filename for each exported cell.

When selected, the command displays the *DTED Export Options* dialog which allows the user to setup the export. The dialog consists of a DTED Options panel which allows the user to set up the DTED level and other options, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

ADVANCED USERS: You can change the accuracy value exported in DTED files by specifying your own string value (up to 4 characters in length) at "HKEY_CURRENT_USER\Software\Global Mapper\DTEDAccuracy". The collection system value (up to 12 characters in length) can be specified at "HKEY_CURRENT_USER\Software\Global Mapper\DTEDCollectionSystem".

Note: Only registered users of Global Mapper are able to export data to any format.

Export DXF 3D Face File Command

The Export DXF 3D Face File command allows the user to export any loaded gridded elevation data sets to a DXF 3D Face file.

When selected, the command displays the *DXF 3D Face Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export DXF Mesh Command

The Export DXF Mesh command allows the user to export any loaded elevation grid data sets to a 3D DXF Mesh file.

When selected, the command displays the *DXF Mesh Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export DXF Point Command

The Export DXF Point command allows the user to export any loaded elevation grid data sets to a 3D DXF Point file. The DXF file will consist of a 3D DXF point for each point in the elevation grid defined by the spacing and extents that the user specifies. This option may be useful when used with other software packages that do not specify the DXF mesh format.

When selected, the command displays the *3D DXF Point Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export ECW Command

The Export ECW command allows the user to export any loaded raster, vector, and elevation grid data sets to an ECW file. ECW files are highly compressed and great for storing things like satellite imagery. There is no size restriction on exported ECW files, so you can store many terabytes worth of imagery within a single highly compressed ECW file.

When selected, the command displays the *ECW Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the pixel spacing and target compression ration, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export. If you would like to generate a lossless JPG2000 format file, simply slide the **Target Compression Ratio** slider all the way to the right (1:1 target compression ration).

Note: Only registered users of Global Mapper are able to export data to any format.

Export Erdas Imagine Command

The Export Erdas Imagine command allows the user to export any loaded raster, vector,and elevation grid data sets to an Erdas Imagine file.

When selected, the command displays the *Erdas Imagine Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the pixel spacing and format, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Float/Grid Command

The Export Float/Grid command allows the user to export any loaded elevation grid data sets to a Float/Grid format file. The Float/Grid file will consist of a 4-byte IEEE floating point number for each elevation sample in the file, starting at the top-left corner and proceeding across, then down. In addition to the elevation data file, an ESRI-format .hdr file and .prj file will also be generated. There is also an option to allow exporting slope values (in degrees or percent slope if selected) or slope directions (in bearings where 0 is north, 90 is east, etc.) rather than elevation values at each sample location.

When selected, the command displays the *Float/Grid Point Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Geosoft Grid Command

The Export Geosoft Grid command allows the user to export any loaded elevation grid data sets to a Geosoft Binary Grid format file.

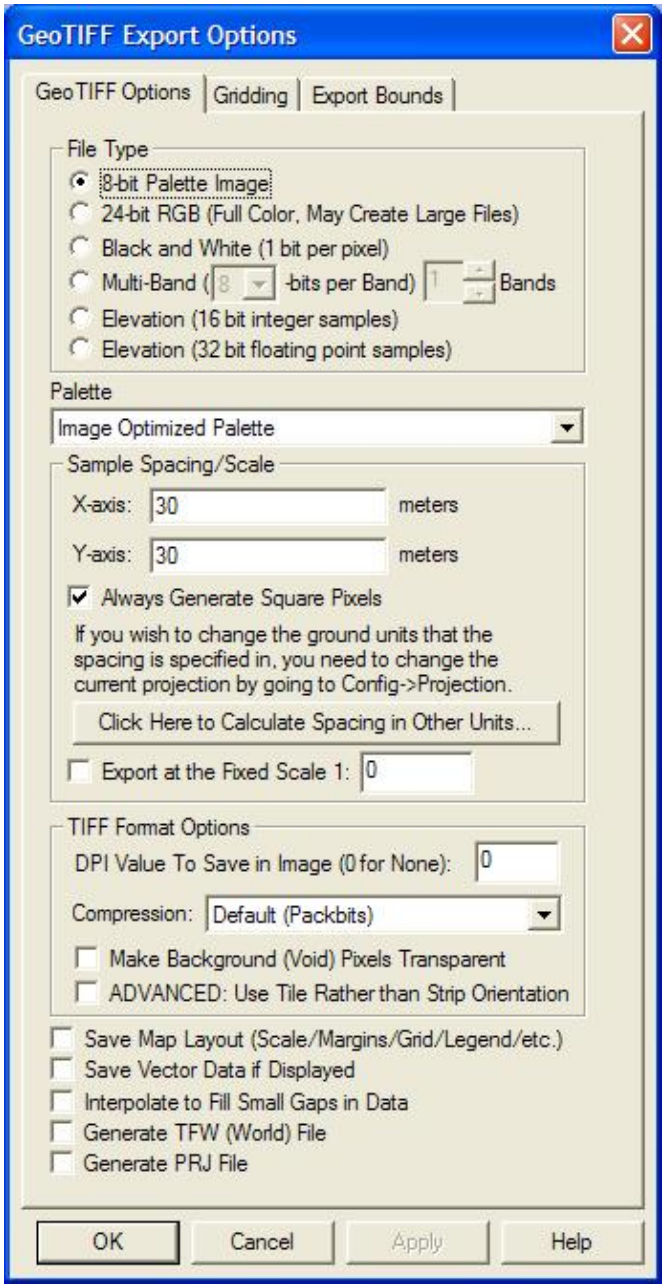
When selected, the command displays the *Geosoft Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing to use, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export GeoTIFF Command

The Export GeoTIFF command allows the user to export any loaded raster, vector, and elevation data sets to a GeoTIFF format file.

When selected, the command displays the *GeoTIFF Export Options* dialog (pictured below) which allows the user to set up the export. The dialog consists of a *GeoTIFF Options* panel, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.


GeoTIFF Export Options
GeoTIFF Options
Gridding
Export Bounds
File Type
8-bit Palette Image
24-bit RGB (Full Color, May Create Large Files)
Black and White (1 bit per pixel)
Multi-Band (8 -bits per Band) 1 Bands
Elevation (16 bit integer samples)
Elevation (32 bit floating point samples)
Palette
Image Optimized Palette
Sample Spacing/Scale
X-axis: 30 meters
Y-axis: 30 meters
Always Generate Square Pixels
If you wish to change the ground units that the spacing is specified in, you need to change the current projection by going to Config->Projection.
Click Here to Calculate Spacing in Other Units...
Export at the Fixed Scale 1: 0
TIFF Format Options
DPI Value To Save in Image (0 for None): 0
Compression: Default (Packbits)
Make Background (Void) Pixels Transparent
ADVANCED: Use Tile Rather than Strip Orientation
Save Map Layout (Scale/Margins/Grid/Legend/etc.)
Save Vector Data if Displayed
Interpolate to Fill Small Gaps in Data
Generate TFW (World) File
Generate PRJ File
OK
Cancel
Apply
Help

The *File Type* section allows you to choose what type of GeoTIFF file to generate. The various file types are described below:

- *8-bit Palette Image* - This option generates a 256-color raster GeoTIFF file with 8-bits per pixel. The *Palette* options described below will apply in this case. This option will generate a relatively small output file, at the expense of some color fidelity depending on the palette that you choose. The image

data will be compressed using the PackBits compression algorithm.

- *24-bit RGB* - This option generates a raster GeoTIFF file with 24-bits per pixel. Uncompressed GeoTIFF images generated with this option will be at least 3 times the size of those generated with the *8-bit Palette* option, but the colors in the image will exactly match what you see on the screen. You can also maintain the exact colors while achieving some compression using the LZW compression option. Selecting the JPEG compression option generates a raster GeoTIFF file with 24-bits per pixel but with the raster data compressed using the JPG compression algorithm. GeoTIFF images generated with this option will maintain good color fidelity and often be highly compressed, although they will lose some information as compared to the uncompressed 24-bit RGB option. Something else to keep in mind if selecting this option is that many software packages do not yet support GeoTIFF files that use the JPEG-in-TIFF compression option. By default the JPG compression used in the GeoTIFF file uses a quality setting of 75, but you can modify this by creating a new DWORD registry key with the desired value at "HKEY_CURRENT_USER\Software\Global Mapper\JpegInTiffQuality".
- *Multi-band* - This option generates a raster GeoTIFF file with 1 or more bands of data at either 8-, 16-, or 32-bits per band of data. This option is very useful when working with multi-spectral imagery with more than 3 bands of data, like RGBI or Landsat imagery, or data sets with more than 8 bits per color channel. If you select this option, after hitting OK to start the dialog additional dialogs will be presented allowing you to further setup the multi-band export by choosing the input sources for each band in the output image.
- *Black and White*- This option generates a two color GeoTIFF file with 1 bit per pixel. This will generate by far the smallest image, but if you source image had more than two colors the resulting image will be very poor. By default, white will be a value of 0 and black will be a value of 1, but you can reverse this by selecint the Grayscale - Min Is Black palette option.
- *Elevation (16-bit integer samples)* - This option generates an elevation GeoTIFF using the currently loaded elevation grid data sets. Elevation samples will be stored as signed 16-bit integers. There are only a handful of software packages that can recognize a vertical GeoTIFF properly, so only use this if you know it works.
- *Elevation (32-bit floating pointr samples)* - This option generates an elevation GeoTIFF using the currently loaded elevation grid data sets. Elevation samples will be stored as 32-bit floating point values. There are only a handful of software packages that can recognize a vertical GeoTIFF properly, so only use this if you know it works.

When generating a 256 color (8-bits per pixel) GeoTIFF, it is necessary to select a palette indicates what 256 colors will be used to describe the image being exported. The following choices of palette are available:

- *Image Optimized Palette* - The palette generated will be an optimal mix of up to 256 colors that will closely represent the full blend of colors in the source images. This option will generate the best results, but can more than double the export time required if any high color images are present in the export set. If all of the input data is palette-based and the combined palette of those files has 256 colors or less, then the combined files of the input file will just be used with no additional export time being required.
- *Grayscale Palette* - This palette consists of 256 scales of gray ranging from black to white.
- *DRG Optimized Palette* - This palette is optimized for the exporting USGS DRG data. The palette consists of only the standard DRG colors.
- *DRG/DOQ Optimized Palette* - As the name suggests, this palette is optimized for exporting a mixture of USGS DRG data and grayscale satellite photos (i.e. USGS DOQs). The palette consists of the 14 standard DRG colors with the remaining 242 colors being a range of gray values ranging from black to white.
- *Halftone Palette* - The palette consists of a blend of 256 colors evenly covering the color spectrum. This palette is the best choice when exporting anything but DRGs and grayscale satellite photos.

- *Custom Palette from File* - This option allows the user to choose a .pal file describing the palette to use for the export. A .pal file should be a text file with one line per color, with the red, green, and blue color components for each color in the palette separated by a comma. You can save a .pal file for an existing palette-based file by opening the Overlay Control Center, selecting the palette-based layer, press Options, then the Transparent Color button, then selecting the option to save a color palette file.
- *Grayscale - Min is Black Palette* - This palette creates an 8-bit per pixel grayscale image with no color map stored in the image. Black will be stored as zero with varying shades of gray up to white with a value of 255.
- *Grayscale - Min is White Palette* - This palette creates an 8-bit per pixel grayscale image with no color map stored in the image. White will be stored as zero with varying shades of gray up to black with a value of 255.

The *Vertical Units* field allows the user to select the vertical units to use when exporting elevation data (i.e. meters or feet). Any input data not in the selected vertical units will be automatically converted on export.

The *Resolution* section allows the user to selected the grid spacing to use when generating the GeoTIFF. The default value is the average of the grid spacings of all the currently loaded raster and elevation overlays. If the *Always Generate Square Pixels* option is checked, the smaller of the specified x and y resolutions will be used for both the x and y resolution. Forcing square pixels ensures that the resultant GeoTIFF file will look good even in software that is not able to deal with pixels that aren't square. If you'd like to specify the spacing in units other than those of the currently selected view/export projection, press the *Click Here to Calculate Spacing in Other Units* button.

If you want to generate a GeoTIFF file corresponding to a particular scale relative to the selected DPI value (see below), you can check the *Export at the Fixed Scale* option and then specify the scale to use. For example, if you specify a scale value of 25000, each inch in the output (an inch being the number of pixels equal to the specified DPI value) will be approximately equivalent to 25,000 inches on the ground.

The *DPI Value to Save in Image* option allows you to specify a DPI (dots per inch) value to save in the TIFF header. Some software, in particular graphics editing software, makes use of this value when sizing TIFF files for printout. Specifying the default value of 0 will result in the DPI tag not being saved to the TIFF file at all.

The *Compression* selection allows you to select what type of compression to use for the selected export file type. The available compression types are as follows:

- *No Compression* - The exported data is not compressed.
- *Packbits* - The palette-based image will be compressed using the lossless Packbits algorithm.
- *LZW Compression* - The data will be compressed using the lossless LZW algorithm. Note that not all applications can load a LZW-compressed GeoTIFF file.
- *CCITT/Fax4* - The 1-bit black-and-white image will be compressed using the lossless CCITT/Fax4 algorithm.
- *JPEG Compression* - The 24-bit color image will be compressed using the lossy JPEG algorithm. Note that not all applications support loading JPEG-in-TIFF encoded files.

If the *Make Background (Void) Pixels Transparent* option is checked for 8-bit palette, 24-bit RGB, or JPEG-in-TIFF files, an alpha channel will be added to the created GeoTIFF file to indicate which pixels should be treated as transparent. Note that this will create a larger file and not all applications will support TIFF files with alpha channels.

If the *ADVANCED: Use Tile Rather than Strip Orientation* option is checked, the GeoTIFF file will use a tile-based organization rather than a strip/scanline-based orientation. A tile-based orientation has advantages

when zoomed in on a layer for display, but can be slower when zoomed further out. By default a tile size of 128x128 will be used, but you can customize this by creating a DWORD registry key value 'HKEY_CURRENT_USER\Software\Global Mapper\GeoTIFFExport_TileSize' with the desired tile size (like 256 for example for 256x256 tiles).

If the *Save Scale/Elevation Legend/Grid if Displayed* option is checked, the distance scale, elevation legend, and coordinate grid will be saved to the GeoTIFF file (except vertical GeoTIFFs) if they are configured to show up in the main display.

If the *Save Vector Data if Displayed* option is checked, any loaded vector data that is configured to show up in the main display will be saved to the GeoTIFF file (except vertical GeoTIFFs).

If the *Generate TFW File* option is checked a TIFF world file will be generated with the same name as the GeoTIFF file with a .tfw extension. The TFW file is used by software that is not capable of reading the placement of the GeoTIFF file directly from the GeoTIFF header.

If the *Interpolate to Fill Small Gaps in Data* option is checked, any small areas with missing data will be filled in by interpolating the surrounding valid data. This is useful for filling small gaps between adjacent tiles or small holes in elevation data.

If the *Generate PRJ File* option is checked a describing the projection of the coordinates in the file will automatically be created

Export Global Mapper Grid Command

The Export Global Mapper Grid command allows the user to export any loaded elevation grid data sets to a Global Mapper Grid format file. The Global Mapper Grid format is a highly compressed elevation grid format that loads and draws very quickly and requires very little memory. If you have a choice for what format to store your gridded elevation data in, we suggest using the Global Mapper Grid format.

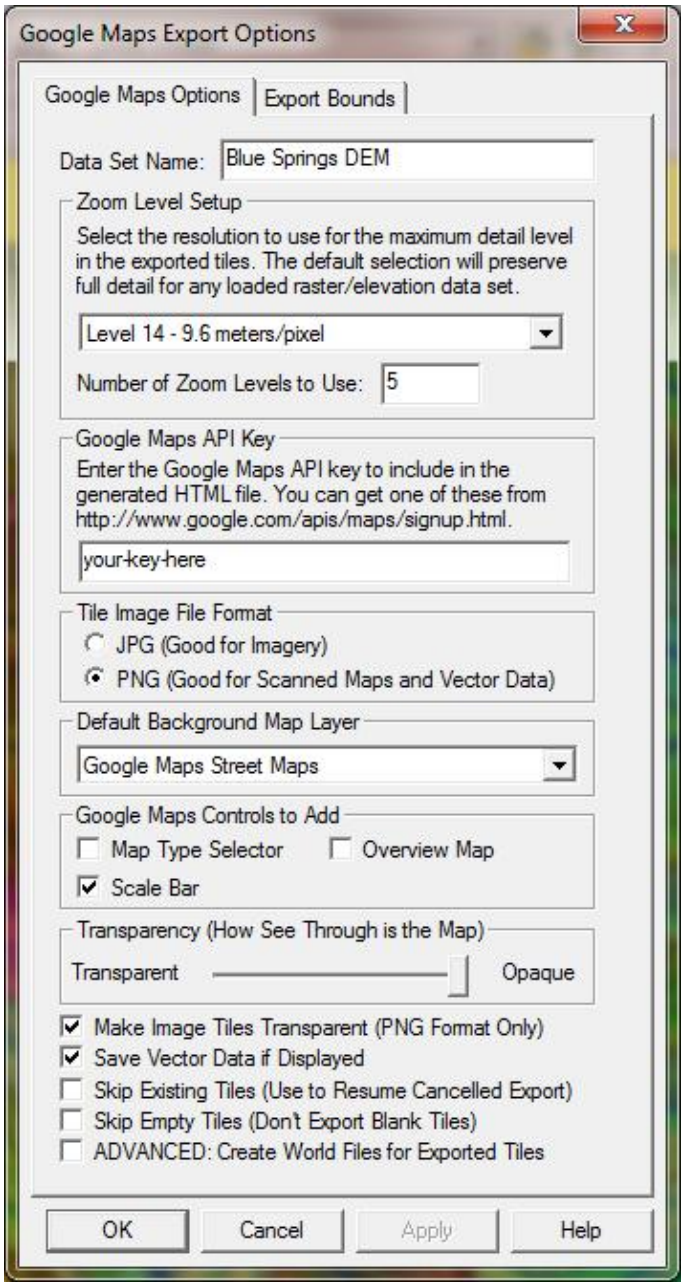
When selected, the command displays the *Global Mapper Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Google Maps Tiles Command

The Export Google Maps Tiles command allows the user to export any loaded datato JPG or PNG files tiled in the configuration required for display in using the Google Maps interface. This command will create both the image tiles and a sample HTML file for displaying the data with the Google Maps interface. You can just load the HTML file into your web browser to view the data once the export is over. You can also customize the HTML file however you need to.

When you select the command, the *Google Maps Export Options* dialog (pictured below) appears allowing you to setup the export. This dialog allows you to specify the display name of the map set in your web browser, the zoom level setup, the Google Maps API key to use, the format of the imagery, and some additional options. There is also an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.


Google Maps Export Options
Google Maps Options
Export Bounds
Data Set Name:
Blue Springs DEM
Zoom Level Setup
Select the resolution to use for the maximum detail level in the exported tiles. The default selection will preserve full detail for any loaded raster/elevation data set.
Level 14 - 9.6 meters/pixel
Number of Zoom Levels to Use:
5
Google Maps API Key
Enter the Google Maps API key to include in the generated HTML file. You can get one of these from http://www.google.com/apis/maps/signup.html.
your-key-here
Tile Image File Format
JPG (Good for Imagery)
PNG (Good for Scanned Maps and Vector Data)
Default Background Map Layer
Google Maps Street Maps
Google Maps Controls to Add
Map Type Selector
Overview Map
Scale Bar
Transparency (How See Through is the Map)
Transparent
Opaque
Make Image Tiles Transparent (PNG Format Only)
Save Vector Data if Displayed
Skip Existing Tiles (Use to Resume Cancelled Export)
Skip Empty Tiles (Don't Export Blank Tiles)
ADVANCED: Create World Files for Exported Tiles
OK
Cancel
Apply
Help

Note: Users without a permanent registration key that export Google Maps tiles will get a large diagonal DEMO symbol across the image. Registered users will not see that symbol on their output.

Export Gravsoft Grid Command

The Export Gravsoft Grid command allows the user to export any loaded elevation grid data sets to a Gravsoft Grid format file.

When selected, the command displays the *Gravsoft Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export HF2/HFZ Command

The Export HF2/HFZ command allows the user to export any loaded raster, vector,and elevation grid data sets to an HF2/HFZ format file.

When selected, the command displays the *HF2/HFZ Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the pixel spacing and format, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Idrisi Command

The Export Idrisi command allows the user to export any loaded raster, vector,and elevation grid data sets to an Idrisi file.

When selected, the command displays the *Idrisi Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the pixel spacing and format, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export JPG Command

The Export JPG command allows the user to export any loaded raster, vector, and elevation grid data sets to a JPG file.

When selected, the command displays the *JPG Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the pixel spacing, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export JPG2000 Command

The Export JPG2000 command allows the user to export any loaded raster, vector, and elevation grid data sets to a JPG2000 format file. JPG2000 files are highly compressed and great for storing things like satellite imagery. There is no size restriction on exported JPG2000 files, so you can store many terabytes worth of imagery within a single highly compressed JPG2000 file.

When selected, the command displays the *JPG2000 Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the pixel spacing and target compression ration, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export. If you would like to generate a lossless JPG2000 format file, simply slide the **Target Compression Ratio** slider all the way to the right (1:1 target compression ration).

Note: Only registered users of Global Mapper are able to export data to any format.

Export JPEG2000 Elevation Command

The Export JPEG2000 Elevation command allows the user to export any loaded elevation grid data sets to a 32-bit JPEG2000 format elevation grid format file, providing excellent (but lossy) compression of gridded elevation data sets.

When selected, the command displays the *JPEG2000 Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the pixel spacing and format, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

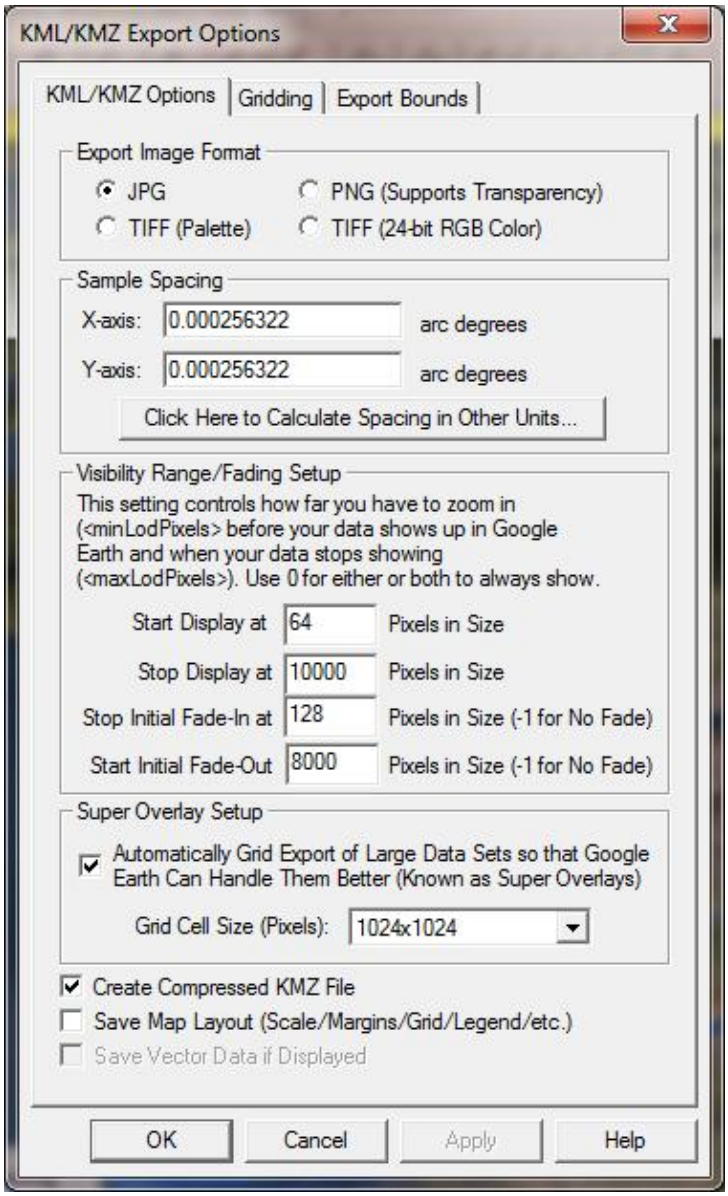
Export KML/KMZ Command

The Export KML/KMZ command allows the user to export any loaded raster, vector, and elevation grid data sets to a KML/KMZ format file for display in Google Earth. If you are wanting to export a vector KML/KMZ file from loaded vector data, use the File->Export Vector Data->Export KML/KMZ menu command instead.

When selected, the command displays the *KML/KMZ Export Options* dialog (pictured below) which allows the user to setup the export. The dialog consists of a KML/KMZ Options panel, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

The KML/KMZ Options panel allows the user to set up the target image format for storage and the sample spacing, as well as other options such as whether to store all of the resulting files in a KMZ file (recommended) and whether or not to render and save loaded vector data. The *Visibility Range/Fading Setup* section allows advanced users to control the *minLodPixels*, *maxLodPixels*, *minFadeExtent*, and *maxFadeExtent* values used in the exported file to control when (i.e. what zoom level) the data will be displayed and also if and how to fade the data.

There is also an option to automatically grid the data on export (this creates what is known as a SuperOverlay). Enabling this option allows very large quantities of data to be efficiently viewed using Google Earth. When using this option you can also control the tile size to use when creating the super overlays. For very large exports the larger sizes (1024x1024 or 2048x2048) are recommended.


KML/KMZ Export Options
KML/KMZ Options
Gridding
Export Bounds
Export Image Format
JPG
PNG (Supports Transparency)
TIFF (Palette)
TIFF (24-bit RGB Color)
Sample Spacing
X-axis: 0.000256322 arc degrees
Y-axis: 0.000256322 arc degrees
Click Here to Calculate Spacing in Other Units...
Visibility Range/Fading Setup
This setting controls how far you have to zoom in (<minLodPixels> before your data shows up in Google Earth and when your data stops showing (<maxLodPixels>). Use 0 for either or both to always show.
Start Display at 64 Pixels in Size
Stop Display at 10000 Pixels in Size
Stop Initial Fade-In at 128 Pixels in Size (-1 for No Fade)
Start Initial Fade-Out 8000 Pixels in Size (-1 for No Fade)
Super Overlay Setup
Automatically Grid Export of Large Data Sets so that Google Earth Can Handle Them Better (Known as Super Overlays)
Grid Cell Size (Pixels): 1024x1024
Create Compressed KMZ File
Save Map Layout (Scale/Margins/Grid/Legend/etc.)
Save Vector Data if Displayed
OK
Cancel
Apply
Help

Note: Only registered users of Global Mapper are able to export data to any format.

Export Leveller Heightfield Command

The Export Leveller Heightfield command allows the user to export any loaded elevation grid data sets to a Leveller Heightfield file for use with the Daylon Leveller application.

When selected, the command displays the *Leveller Heightfield Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Lidar LAS Command

The Export Lidar LAS command allows the user to export any loaded elevation grid data sets to Lidar LAS format files.

When selected, the command displays the *Lidar LAS Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export NITF Command

The Export NITF command allows the user to export any loaded raster, vector, and elevation grid data sets to a NITF (National Imagery Transmission Format) file.

When selected, the command displays the *NITF Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the pixel spacing, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Optimi Terrain File Command

The Export Optimi Terrain File command allows the user to export any loaded elevation grid data sets to an Optimi Terrain format grid file. These terrain files can be used with applications from Optimi.

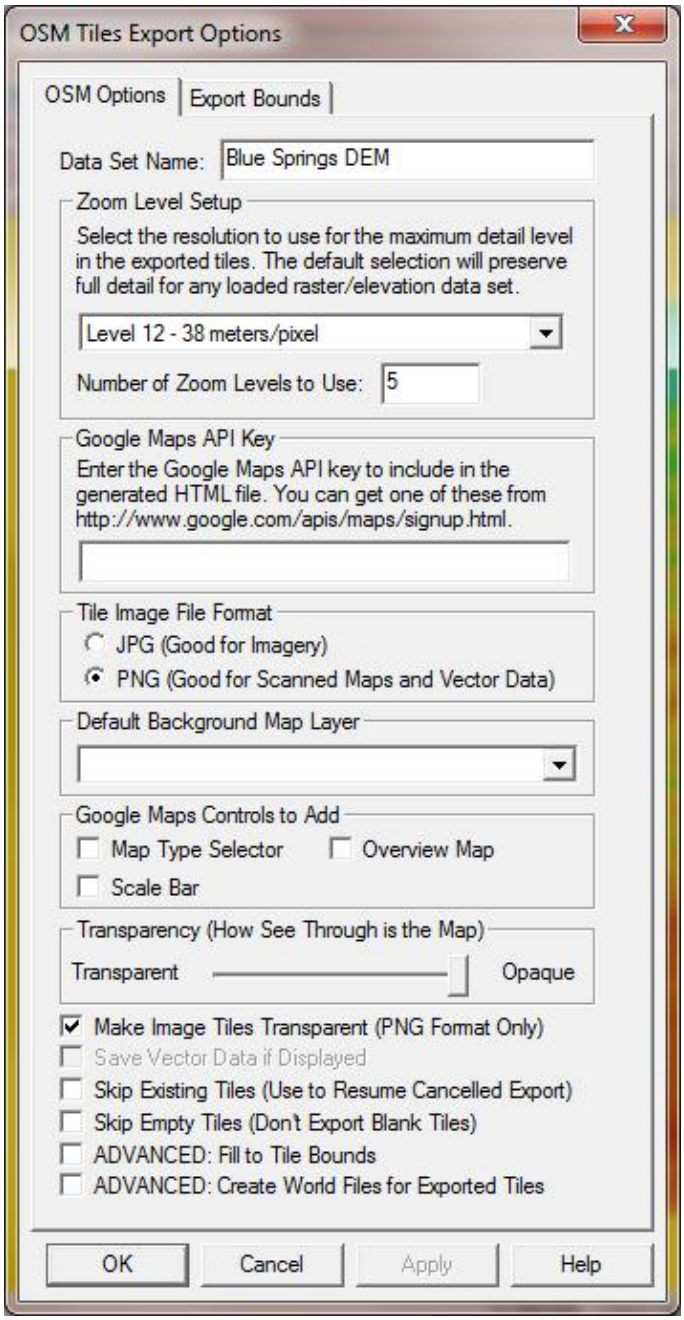
When selected, the command displays the *Optimi Terrain Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export OSM/TMS Tiles Command

The Export OSM (OpenStreetMaps.org) and Export TMS Tiles commands allows the user to export any loaded data to JPG or PNG files tiled in the configuration required for display in using either the OSM (OpenStreetMaps.org) or TMS (Tile Map Service) naming and tiling standards. This command will create both the image tiles and a sample HTML file for displaying the data within a web browser. You can just load the HTML file into your web browser to view the data once the export is over, but you will likely want to customize it to your needs.

When you select the command, the *OSM Tiles Export Options* dialog (pictured below) appears allowing you to setup the export. This dialog allows you to specify the display name of the map set in your web browser, the zoom level setup, the format of the imagery, and some additional options. There is also an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.


OSM Tiles Export Options
OSM Options
Export Bounds
Data Set Name:
Blue Springs DEM
Zoom Level Setup
Select the resolution to use for the maximum detail level in the exported tiles. The default selection will preserve full detail for any loaded raster/elevation data set.
Level 12 - 38 meters/pixel
Number of Zoom Levels to Use:
5
Google Maps API Key
Enter the Google Maps API key to include in the generated HTML file. You can get one of these from http://www.google.com/apis/maps/signup.html.
Tile Image File Format
JPG (Good for Imagery)
PNG (Good for Scanned Maps and Vector Data)
Default Background Map Layer
Google Maps Controls to Add
Map Type Selector
Overview Map
Scale Bar
Transparency (How See Through is the Map)
Transparent
Opaque
Make Image Tiles Transparent (PNG Format Only)
Save Vector Data if Displayed
Skip Existing Tiles (Use to Resume Cancelled Export)
Skip Empty Tiles (Don't Export Blank Tiles)
ADVANCED: Fill to Tile Bounds
ADVANCED: Create World Files for Exported Tiles
OK
Cancel
Apply
Help

Note: Users without a permanent registration key that export Google Maps tiles will get a large diagonal DEMO symbol across the image. Registered users will not see that symbol on their output.

Export PGM File Command

The Export PGM File command allows the user to export any loaded elevation grid data sets to a PGM grayscale grid file. These grid files can be used with any software application that supports PGM files.

When selected, the command displays the *PGM Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export PLS-CADD XYZ File Command

The Export PLS-CADD XYZ File command allows the user to export any loaded elevation grid data sets to a PLS-CADD XYZ format grid file. These grid files can be used with the PLS-CADD software application.

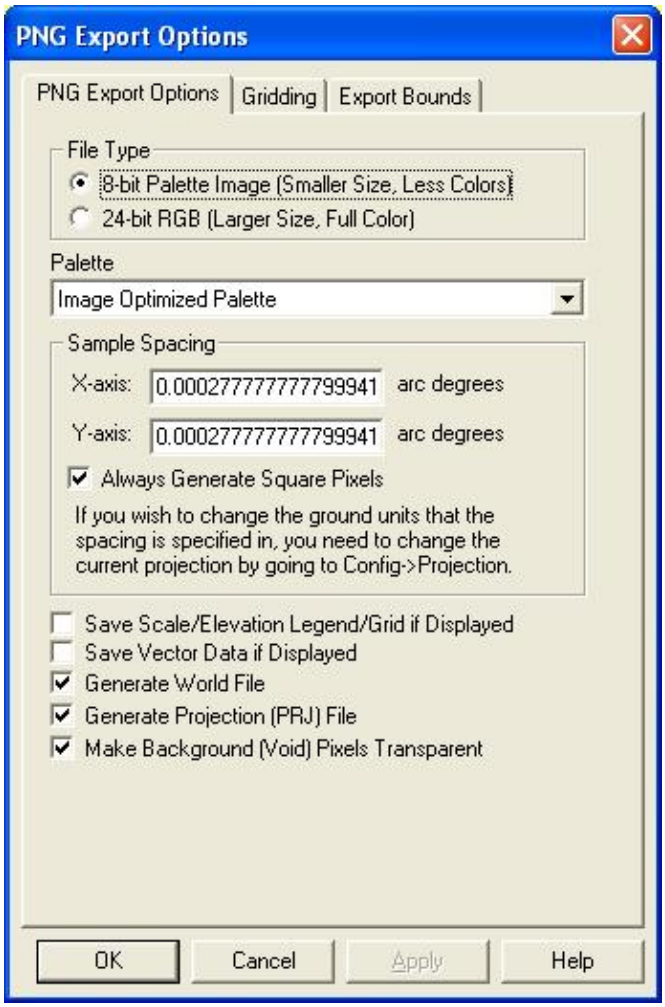
When selected, the command displays the *PLS-CADD XYZ Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export PNG Command

The Export PNG command allows the user to export any loaded data sets to a PNG file.

When selected, the command displays the *PNG Export Options* dialog which allows the user to setup the export. The dialog consists of an Options panel (pictured below), which allows the user to select whether to export an 8-bit palette-based PNG or a 24-bit RGB PNG file, as well as other applicable options, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.



Note: Only registered users of Global Mapper are able to export data to any format.

Export RockWorks Grid Command

The Export RockWorks Grid command allows the user to export any loaded elevation grid data sets to a RockWorks Grid format file.

When selected, the command displays the *RockWorks Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export STL Command

The Export STL command allows the user to export any loaded elevation grid data sets to a STL format file for use with some CAD systems.

When selected, the command displays the *STL Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and

vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Surfer Grid (ASCII Format) Command

The Export Surfer Grid (ASCII Format) command allows the user to export any loaded elevation grid data sets to an ASCII format Surfer Grid file.

When selected, the command displays the *Surfer Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Surfer Grid (Binary v6 Format) Command

The Export Surfer Grid (Binary v6 Format) command allows the user to export any loaded elevation grid data sets to a binary format Surfer Grid file compatible with Surfer v6 and above. Binary format Surfer Grids will be smaller than their ASCII-format cousins, so if you can use the binary format I would suggest it.

When selected, the command displays the *Surfer Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Surfer Grid (Binary v7 Format) Command

The Export Surfer Grid (Binary v7 Format) command allows the user to export any loaded elevation grid data sets to a binary format Surfer Grid file compatible with Surfer v7 and above. Binary format Surfer Grids will be smaller than their ASCII-format cousins, so if you can use the binary format I would suggest it.

When selected, the command displays the *Surfer Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Terragen Terrain File Command

The Export Terragen Terrain File command allows the user to export any loaded elevation grid data sets to a Terragen terrain file.

When selected, the command displays the *Terragen Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Vertical Mapper (MapInfo) Grid File Command

The Export Vetical Mapper (MapInfo) Grid File command allows the user to export any loaded elevation grid data sets to a Vertical Mapper GRD format file.

When selected, the command displays the *Vertical Mapper Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Vulcan3D Triangulation File Command

The Export Vulcan3D Triangulation File command allows the user to export any loaded elevation grid data sets to a Vulcan3D triangulation file.

When selected, the command displays the *Vulcan3D Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export VRML Command

The Export VRML command allows the user to export any loaded elevation grid data and raster data sets to a VRML file for display in a VRML viewer, such as the Cortona VRML Client.

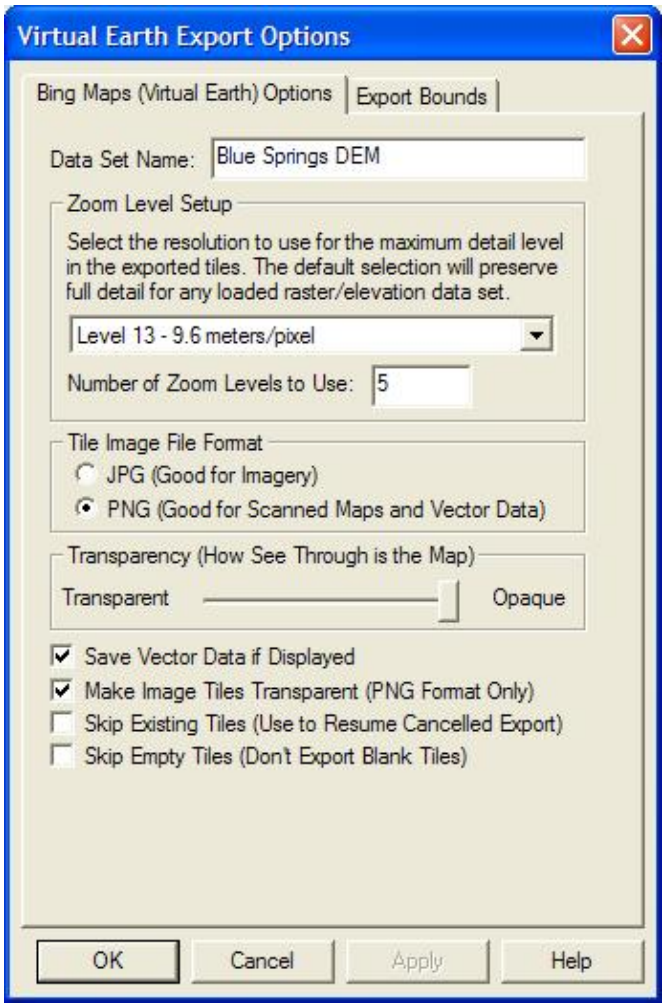
When selected, the command displays the *VRML World File Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing, vertical exaggeration, and compression options, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Bing Maps (Virtual Earth) Tiles Command

The Export Bing Maps (Virtual Earth) Tiles command allows the user to export any loaded data to JPG or PNG files tiled in the configuration required for display in using the Microsoft Bing Maps (Virtual Earth) interface. This command will create both the image tiles and a sample HTML file for displaying the data with the Bing Maps (Virtual Earth) interface. You can just load the HTML file into your web browser to view the data once the export is over. You can also customize the HTML file however you need to.

When you select the command, the *Bing Maps Export Options* dialog (pictured below) appears allowing you to setup the export. This dialog allows you to specify the display name of the map set in your web browser, the zoom level setup, the format of the imagery, and some additional options. There is also an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

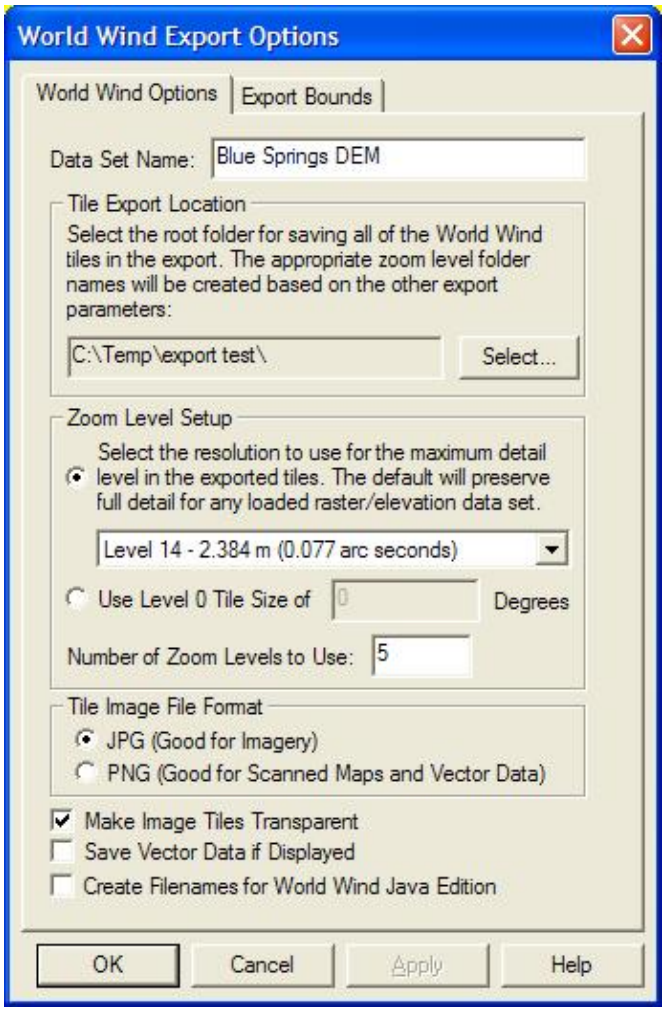

Virtual Earth Export Options
Bing Maps (Virtual Earth) Options
Export Bounds
Data Set Name:
Blue Springs DEM
Zoom Level Setup
Select the resolution to use for the maximum detail level in the exported tiles. The default selection will preserve full detail for any loaded raster/elevation data set.
Level 13 - 9.6 meters/pixel
Number of Zoom Levels to Use:
5
Tile Image File Format
JPG (Good for Imagery)
PNG (Good for Scanned Maps and Vector Data)
Transparency (How See Through is the Map)
Transparent
Opaque
Save Vector Data if Displayed
Make Image Tiles Transparent (PNG Format Only)
Skip Existing Tiles (Use to Resume Cancelled Export)
Skip Empty Tiles (Don't Export Blank Tiles)
OK
Cancel
Apply
Help

Note: Users without a permanent registration key that export Virtual Earth tiles will get a large diagonal DEMO symbol across the image. Registered users will not see that symbol on their output.

Export World Wind Tiles Command

The Export World Wind Tiles command allows the user to export any loaded data to JPG or PNG files tiled in the configuration required by NASA's World Wind application. This command will create both the image tiles and the XML file required for World Wind to use the data. You should place the generated .xml file in the Config\Earth folder under your World Wind installation folder in order for it to be picked up by World Wind.

When you select the command, the *World Wind Export Options* dialog (pictured below) appears allowing you to setup the export. This dialog allows you to specify the display name of the map set in World Wind, the base directory to which the directory tree of map tiles will be exported, the zoom level setup, the format of the imagery, and some additional options. There is also an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

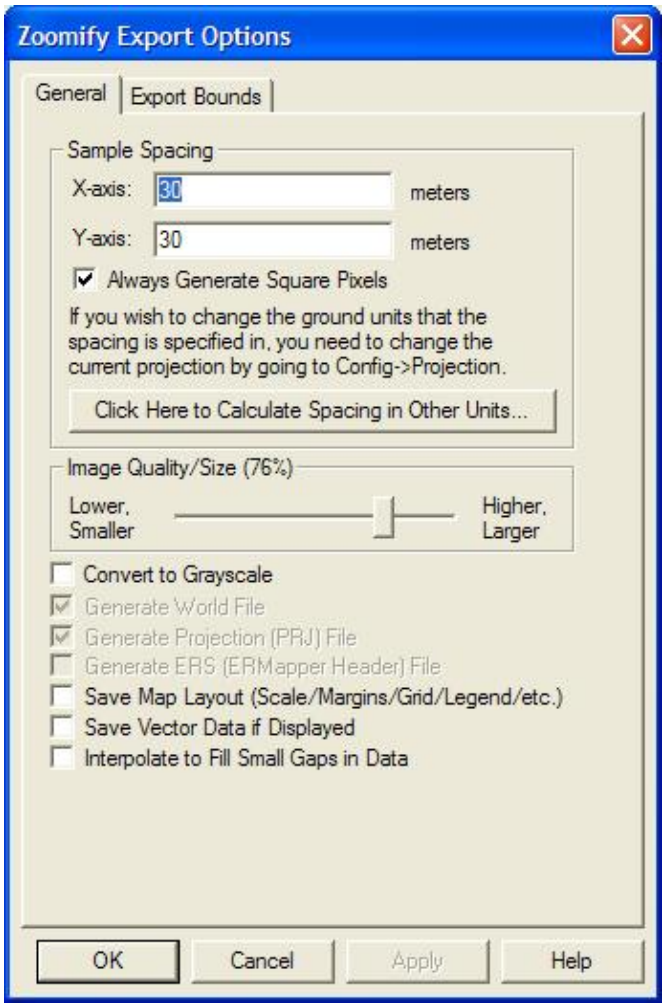

World Wind Export Options
World Wind Options
Export Bounds
Data Set Name:
Blue Springs DEM
Tile Export Location
Select the root folder for saving all of the World Wind tiles in the export. The appropriate zoom level folder names will be created based on the other export parameters:
C:\Temp\export test\
Select...
Zoom Level Setup
Select the resolution to use for the maximum detail level in the exported tiles. The default will preserve full detail for any loaded raster/elevation data set.
Level 14 - 2.384 m (0.077 arc seconds)
Use Level 0 Tile Size of
Degrees
Number of Zoom Levels to Use:
5
Tile Image File Format
JPG (Good for Imagery)
PNG (Good for Scanned Maps and Vector Data)
Make Image Tiles Transparent
Save Vector Data if Displayed
Create Filenames for World Wind Java Edition
OK
Cancel
Apply
Help

Note: Users without a permanent registration key that export World Wind tiles will get a large diagonal DEMO symbol across the image. Registered users will not see that symbol on their output.

Export Zoomify Tiles Command

The Export Zoomify Tiles command allows the user to export any loaded data to JPG files tiled in the configuration required by the Zoomify viewer. This command will create both the image tiles and the XML file required for Zoomify to use the data. You will also need the Zoomify plugin to allow viewing the data. Global Mapper is not allowed to distribute that, so you will have to obtain it from Zoomify yourself.

When you select the command, the *Zoomify Export Options* dialog (pictured below) appears allowing you to setup the export. This dialog allows you to specify the sample spacing and some additional options. There is also an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.



Note: Only registered users of Global Mapper are able to export data to any format.

Export XYZ Grid Command

The Export XYZ Grid command allows the user to export any loaded elevation grid data sets to a comma-delimited ASCII XYZ file. Each grid point will be represented as follows (actual coordinate delimiter is configurable):

```
x-coordinate,y-coordinate,z-coordinate
```

When selected, the command displays the *XYZ Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Zmap Plus Grid File Command

The Export Zmap Plus Grid File command allows the user to export any loaded elevation grid data sets to a Zmap Plus Grid format file.

When selected, the command displays the *Zmap Plus Grid Export Options* dialog which allows the user to setup the export. The dialog consists of a General options panel which allows the user to set up the grid spacing and vertical units and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Vector Data

The commands on the Export Vector Data submenu allow the user to export loaded vector data to various formats.

Export Arc Ungenerate Command

The Export Arc Ungenerate commands allows the user to export any loaded vector data sets to an Arc Ungenerate format file.

When selected, the command displays the *Arc Ungenerate Export Options* dialog which consists of an Export Bounds panel that allows the user to set up the portion of the loaded vector data they wish to export.

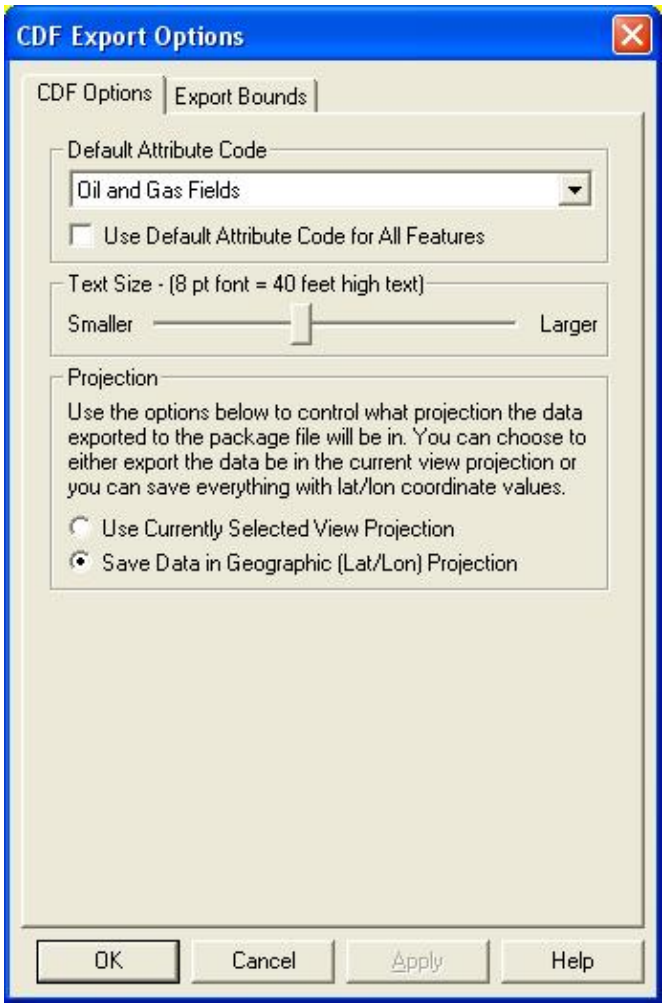
Note: Only registered users of Global Mapper are able to export data to any format.

Export CDF Command

The Export CDF command allows the user to export any loaded vector data sets to a CDF (Common Data Format) file.

When selected, the command displays the *CDF Export Options* dialog (pictured below) which allows the user to set up the export. The dialog consists of a *CDF Options* panel which allows the user to set up the attribute code to assign to features and the text size in the export file, and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

If the *Use Default Attribute for All Features* option is checked, the attribute selected in the *Default Attribute Code* panel will be used for all features. Otherwise, the selected attribute will only be used for those features whose Global Mapper classification could not be automatically mapped to one of the CDF attributes.


CDF Export Options
CDF Options
Export Bounds
Default Attribute Code
Oil and Gas Fields
Use Default Attribute Code for All Features
Text Size - (8 pt font = 40 feet high text)
Smaller
Larger
Projection
Use the options below to control what projection the data exported to the package file will be in. You can choose to either export the data be in the current view projection or you can save everything with lat/lon coordinate values.
Use Currently Selected View Projection
Save Data in Geographic (Lat/Lon) Projection
OK
Cancel
Apply
Help

Note: Only registered users of Global Mapper are able to export data to any format.

Export CSV Command

The Export CSV command allows the user to export any loaded point data sets to a CSV (Comma Separated File) file.

When selected, the command displays the *CSV Export Options* dialog which allows the user to set up the export. The dialog consists of an *Options* panel which allows the user to set up options such whether or not to include an elevation attribute for each point as well as whether to include the name of each column in the file as the first row in the file. There is also an Export Bounds panel which allows the user to set up the portion of the loaded point data they wish to export.

If you choose to *Export Separate Lat/Lon Coordinates for Each Point*, the LATITUDE and LONGITUDE attributes that are created will use the current Position Display Format setting on the General tab of the Configuration dialog for formatting those values if you also have the option checked to *Format lat/lon coordinates with Position Display Format*.

ADVANCED USERS - In Global Mapper v11.02 and later you can customize the number of decimal digits written out for the X and Y coordinates for a CSV export through the use of a DWORD registry key 'HKEY_CURRENT_USER\Software\Global Mapper\ASCIIExportCoordPrecision'. For example, set this

value to 6 to get 6 decimal digits for each X, Y, and Z coordinate.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Delft3D (LDB) Command

The Export Delft3D (LDB) command allows the user to export any loaded vector line data sets to a Delft3D (LDB) format file.

When selected, the command displays the *Delft3D Export Options* dialog which consists of an Export Bounds panel that allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export DeLorme Text File Command

The Export DeLorme Text File command allows the user to export any loaded vector features to one of 3 text formats that can be loaded into select DeLorme mapping products.

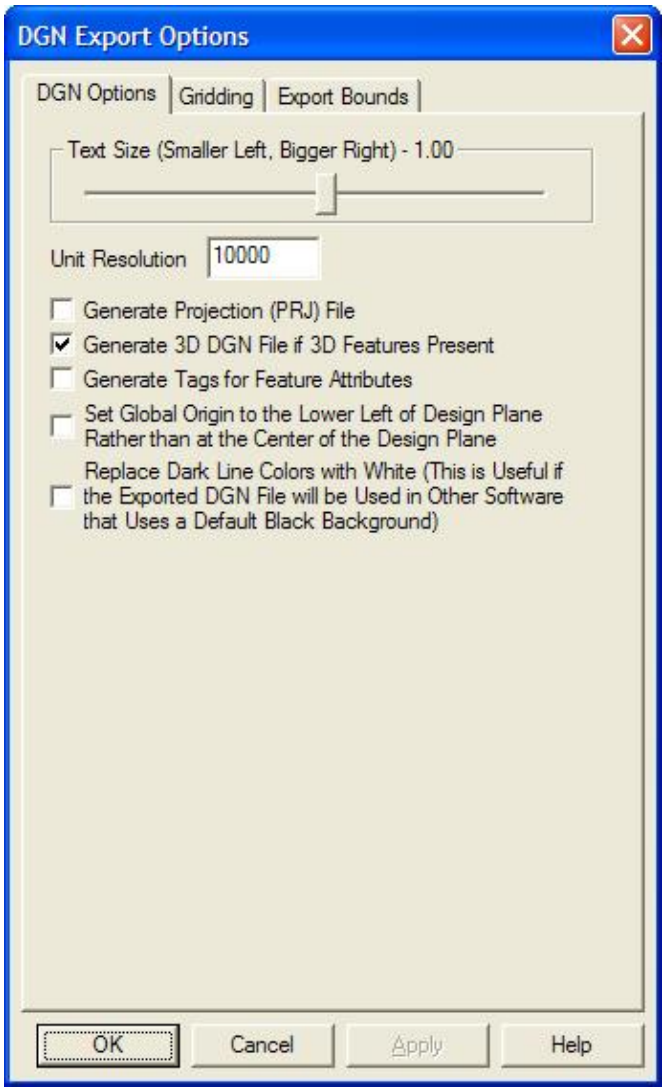
When selected, the command displays the *DeLorme Text Polygon Export Options* dialog which consists of an Export Bounds panel that allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export DGN Command

The Export DGN command allows the user to export any loaded vector data to a MicroStation DGN v8 format file.

When selected, the command displays the *DGN Export Options* dialog (pictured below) which allows the user to set up the export. The dialog consists of a *DGN Options* panel, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.


DGN Export Options
DGN Options
Gridding
Export Bounds
Text Size (Smaller Left, Bigger Right) - 1.00
Unit Resolution
10000
Generate Projection (PRJ) File
Generate 3D DGN File if 3D Features Present
Generate Tags for Feature Attributes
Set Global Origin to the Lower Left of Design Plane Rather than at the Center of the Design Plane
Replace Dark Line Colors with White (This is Useful if the Exported DGN File will be Used in Other Software that Uses a Default Black Background)
OK
Cancel
Apply
Help

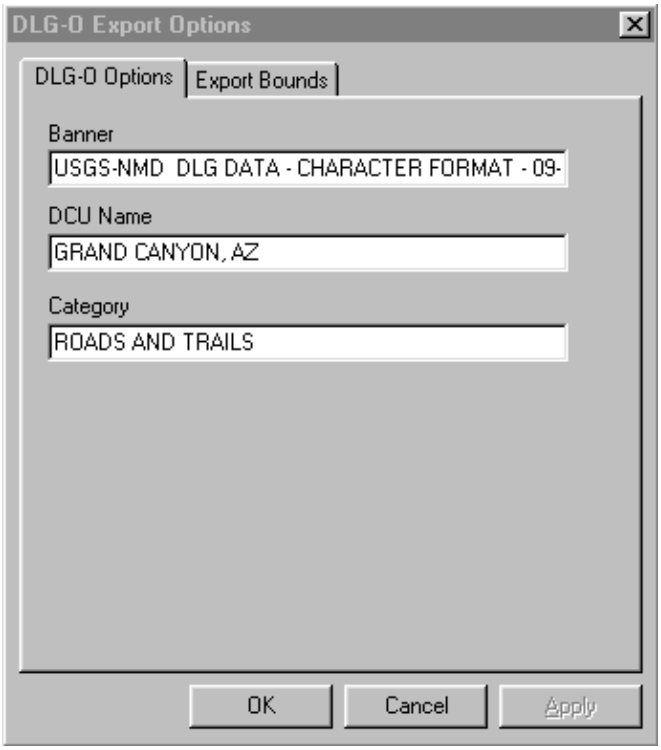
The *Text Size* section allows the user to control how large display label text will be in the created file. The *Unit Resolution* value is used to specify the resolution unit saved in the DGN file. If the *Generate PRJ File* option is checked, a .prj projection file describing the projection of the coordinates in the file will automatically be created. If the *Generate 3D DGN File if 3D Features Present* option is checked, the entire DGN file will be marked as 3D and any features that have a elevation data associated with them will be stored as 3D features. If the *Generate Tags for Feature Attributes* option is checked, any attributes associated with exported features will be saved as tags in the resulting file. Note that this can significantly slow down your export in some cases. If the *Set Global Origin to the Lower Left of Design Plane Rather than the Center of the Design Plane* option is set, the global origin is set to the minimum valid negative values rather than at (0,0) as is standard. If the *Replace Dark Line Colors with White* option is set, any lines that are near black in color will be replaced with a white line automatically. This is useful for getting dark colored lines to show up when the exported DGN file is viewed in an application that uses a black background.

Note: Only registered users of Global Mapper are able to export data to any format.

Export DLG-O Command

The Export DLG-O command allows the user to export any loaded vector data sets to a native format USGS DLG-O (Digital Line Graph Optional format) file.

When selected, the command displays the *DLG-O Export Options* dialog (pictured below) which allows the user to set up the export. The dialog consists of a *DLG-O Options* panel which allows the user to set up the banner name, DCU (digital cartographic unit or quad name), and category name, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export. If possible, the fields on the *DLG-O Options* panel are automatically filled in with the best guesses available based on the currently loaded data. The user is free to change the values to fit their needs.

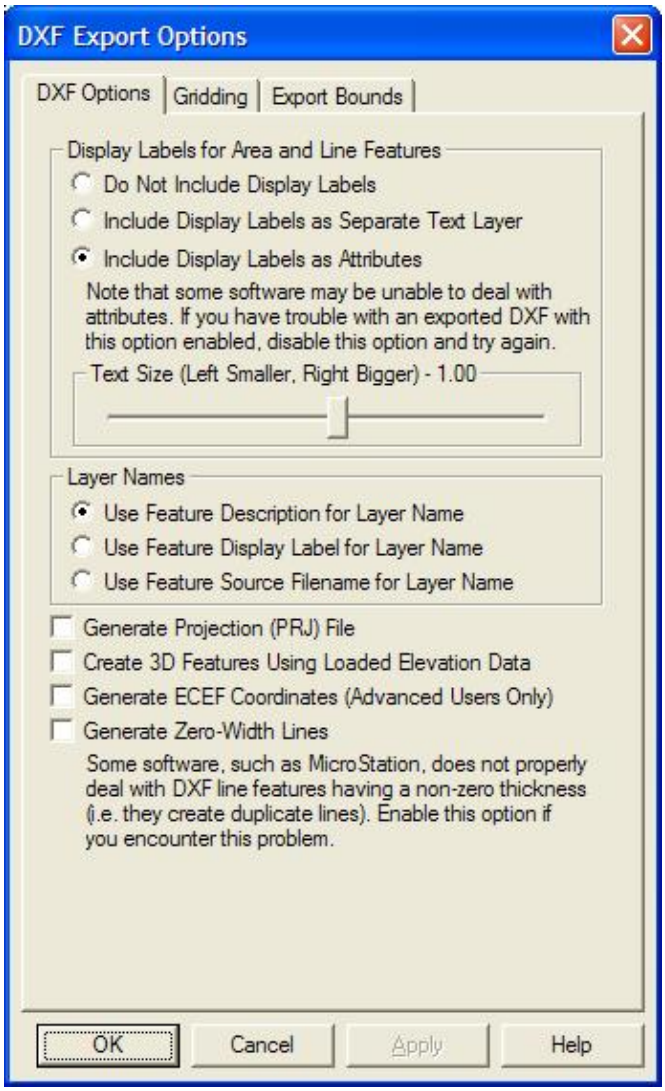


Note: Only registered users of Global Mapper are able to export data to any format.

Export DXF Command

The Export DXF command allows the user to export any loaded vector data sets to an AutoCAD DXF format file.

When selected, the command displays the *DXF Export Options* dialog (pictured below) which allows the user to set up the export. The dialog consists of a *DXF Options* panel, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.


DXF Export Options
DXF Options
Gridding
Export Bounds
Display Labels for Area and Line Features
Do Not Include Display Labels
Include Display Labels as Separate Text Layer
Include Display Labels as Attributes
Note that some software may be unable to deal with attributes. If you have trouble with an exported DXF with this option enabled, disable this option and try again.
Text Size (Left Smaller, Right Bigger) - 1.00
Layer Names
Use Feature Description for Layer Name
Use Feature Display Label for Layer Name
Use Feature Source Filename for Layer Name
Generate Projection (PRJ) File
Create 3D Features Using Loaded Elevation Data
Generate ECEF Coordinates (Advanced Users Only)
Generate Zero-Width Lines
Some software, such as MicroStation, does not properly deal with DXF line features having a non-zero thickness (i.e. they create duplicate lines). Enable this option if you encounter this problem.
OK
Cancel
Apply
Help

The *Display Labels* section allows you to control if you want feature display labels included in the DXF files and, if so, whether you want them represented as TEXT entities in their own layer (called FEATURE_LABEL) or as DXF attributes. The default is to have them included as attributes associated with each feature. As some software packages cannot handle attributes in DXF files, you may have to switch to a different option (with the associated loss of information) to get your exported DXF files to work with some software packages. If you would like line features to have rotated labels running along the line associated with them, you have to use the option to *Include Display Labels as Separate Text Layer*.

The *Layer Names* section allows you to control how the layer names used in the exported DXF file are generated. You can choose to use the feature description, feature display label, or feature source filename as the layer name in the exported file. If you choose to use the display label as the layer name, any features that do not have a display label will use the feature description as the layer name in the exported file.

If selected, the *Generate Projection (PRJ) File* option causes a projection file describing the ground reference system of the DXF file to be generated in addition to the DXF file itself. The PRJ file will have the same name as the DXF file with the .prj extension.

If selected, the *Create 3D Features Using Loaded Elevation Data* option will cause any underlying elevation data (like DEMs) to be used to retrieve elevation values for 2D features being exported and generate new 3D

features in the exported DXF file. The units used by the elevation values are determined by the Elevation Display/Export Units setting on the Vertical Options tab of the Configuration dialog.

If selected, the *Generate ECEF Coordinates* option will cause the exported DXF file to use Earth-Centered Earth-Fixed (ECEF) XYZ coordinate values rather than XY values in the current export projection.

If selected, the *Generate Zero-Width Lines* option causes and line features created in the DXF file to be marked as having zero width. Use this option if you intend to use the resulting DXF file with a product such as MicroStation which has problems with lines of non-zero thickness.

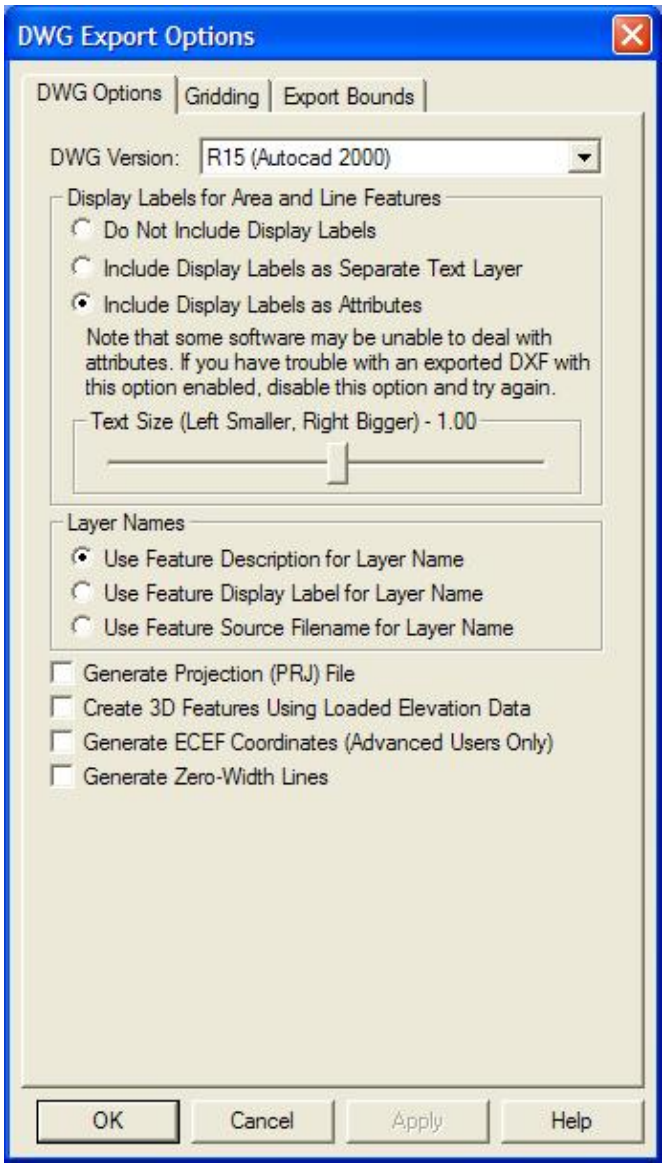
Note that if you export features of the *TIN Face Area* area type they will be exported as 3D Face features in the generated DXF file rather than 3D polylines, allowing you to easily get a usable TIN surface for use in other applications, like 3DS Max.

Note: Only registered users of Global Mapper are able to export data to any format.

Export DWG Command

The Export DWG command allows the user to export any loaded vector data sets to an AutoCAD Drawing (DWG) format file.

When selected, the command displays the *DWG Export Options* dialog (pictured below) which allows the user to set up the export. The dialog consists of a *DWG Options* panel, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.


DWG Export Options
DWG Options
Gridding
Export Bounds
DWG Version:
R15 (Autocad 2000)
Display Labels for Area and Line Features
Do Not Include Display Labels
Include Display Labels as Separate Text Layer
Include Display Labels as Attributes
Note that some software may be unable to deal with attributes. If you have trouble with an exported DXF with this option enabled, disable this option and try again.
Text Size (Left Smaller, Right Bigger) - 1.00
Layer Names
Use Feature Description for Layer Name
Use Feature Display Label for Layer Name
Use Feature Source Filename for Layer Name
Generate Projection (PRJ) File
Create 3D Features Using Loaded Elevation Data
Generate ECEF Coordinates (Advanced Users Only)
Generate Zero-Width Lines
OK
Cancel
Apply
Help

The *DWG Version* section allows you to select which DWG version to create.

The *Display Labels* section allows you to control if you want feature display labels included in the DWG files and, if so, whether you want them represented as TEXT entities in their own layer (called FEATURE_LABEL) or as DWG attributes. The default is to have them included as attributes associated with each feature. As some software packages cannot handle attributes in DWG files, you may have to switch to a different option (with the associated loss of information) to get your exported DWG files to work with some software packages. If you would like line features to have rotated labels running along the line associated with them, you have to use the option to *Include Display Labels as Separate Text Layer*.

The *Layer Names* section allows you to control how the layer names used in the exported DWG file are generated. You can choose to use the feature description, feature display label, or feature source filename as the layer name in the exported file. If you choose to use the display label as the layer name, any features that do not have a display label will use the feature description as the layer name in the exported file.

If selected, the *Generate Projection (PRJ) File* option causes a projection file describing the ground reference system of the DWG file to be generated in addition to the DWG file itself. The PRJ file will have the same

name as the DWG file with the .prj extension.

If selected, the *Create 3D Features Using Loaded Elevation Data* option will cause any underlying elevation data (like DEMs) to be used to retrieve elevation values for 2D features being exported and generate new 3D features in the exported DWG file. The units used by the elevation values are determined by the Elevation Display/Export Units setting on the Vertical Options tab of the Configuration dialog.

If selected, the *Generate ECEF Coordinates* option will cause the exported DWG file to use Earth-Centered Earth-Fixed (ECEF) XYZ coordinate values rather than XY values in the current export projection.

If selected, the *Generate Zero-Width Lines* option causes and line features created in the DWG file to be marked as having zero width. Use this option if you intend to use the resulting DWG file with a product such as MicroStation which has problems with lines of non-zero thickness.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Garmin TRK (PCX5) File Command

The Export Garmin TRK (PCX5) File command allows the user to export any loaded vector line data to a Garmin TRK (PCX5) format file. This file can be imported by a wide variety of GPS software, such as Garmin's MapSource&reg, to facilitate transferring track logs to a GPS unit.

When selected, the command displays the *Garmin TRK Format Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Garmin WPT (PCX5) File Command

The Export Garmin WPT (PCX5) File command allows the user to export any loaded named point data to a Garmin WPT (PCX5) format file. This file can be imported by a wide variety of GPS software, such as Garmin's MapSource&reg, to facilitate transferring waypoints to a GPS unit.

When selected, the command displays the *Garmin WPT Format Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export GOG (Generalized Overlay Graphics) Command

The Export GOG (Generalized Overlay Graphics) command allows the user to export any loaded vector data sets to a GOG format file.

When selected, the command displays the *GOG Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export GPX (GPS eXchange Format) Command

The Export GPX (GPS eXchange Format) commands allows the user to export any loaded point and line data to a GPX (GPS eXchange Format) file.

When selected, the command displays the *GPX Export Options* dialog which consists of an Export Bounds panel that allows the user to set up the portion of the loaded vector data they wish to export. If you want to fill in the <cmt> field of a feature during a GPX export, simply add a COMMENT attribute to the feature with the desired comment.

Note: Only registered users of Global Mapper are able to export data to any format.

Export InRoads ASCII Command

The Export InRoads ASCII command allows the user to export any loaded vector data sets to an InRoads ASCII format file.

When selected, the command displays the *InRoads ASCII Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Hypack Linefile Command

The Export Hypack Linefile command allows the user to export any loaded vector line data sets to a Hypack Linefile format file.

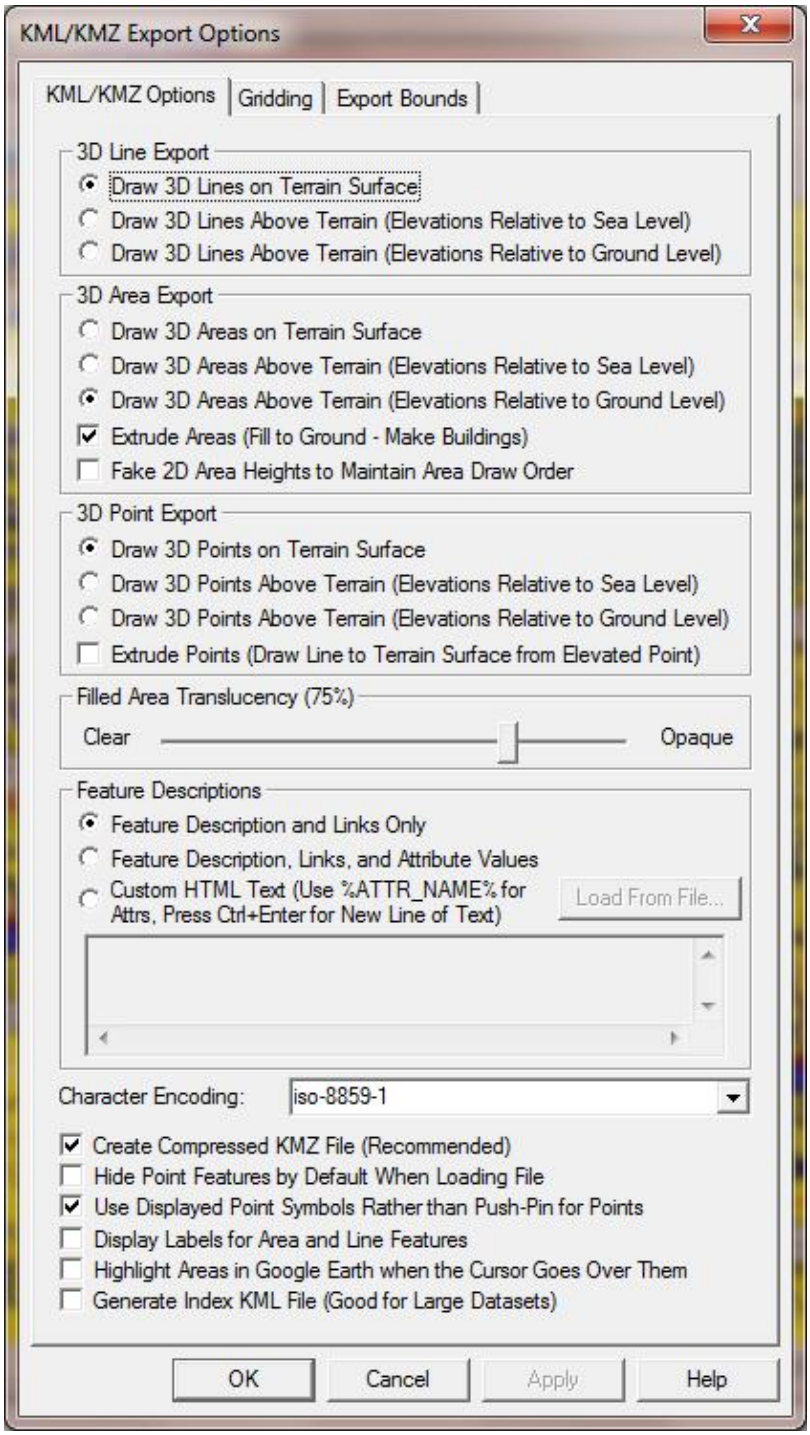
When selected, the command displays the *Hypack Linefile Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export KML/KMZ Command

The Export KML/KMZ command allows the user to export any loaded vector data sets to a KML/KMZ format file for use with Google Earth.

When selected, the command displays the *KML/KMZ Export Options* dialog (pictured below) which allows the user to set up the export. The dialog consists of a *KML/KMZ Options* panel, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.


KML/KMZ Export Options
KML/KMZ Options
Gridding
Export Bounds
3D Line Export
Draw 3D Lines on Terrain Surface
Draw 3D Lines Above Terrain (Elevations Relative to Sea Level)
Draw 3D Lines Above Terrain (Elevations Relative to Ground Level)
3D Area Export
Draw 3D Areas on Terrain Surface
Draw 3D Areas Above Terrain (Elevations Relative to Sea Level)
Draw 3D Areas Above Terrain (Elevations Relative to Ground Level)
Extrude Areas (Fill to Ground - Make Buildings)
Fake 2D Area Heights to Maintain Area Draw Order
3D Point Export
Draw 3D Points on Terrain Surface
Draw 3D Points Above Terrain (Elevations Relative to Sea Level)
Draw 3D Points Above Terrain (Elevations Relative to Ground Level)
Extrude Points (Draw Line to Terrain Surface from Elevated Point)
Filled Area Translucency (75%)
Clear
Opaque
Feature Descriptions
Feature Description and Links Only
Feature Description, Links, and Attribute Values
Custom HTML Text (Use %ATTR_NAME% for Attrs, Press Ctrl+Enter for New Line of Text)
Load From File...
Character Encoding:
iso-8859-1
Create Compressed KMZ File (Recommended)
Hide Point Features by Default When Loading File
Use Displayed Point Symbols Rather than Push-Pin for Points
Display Labels for Area and Line Features
Highlight Areas in Google Earth when the Cursor Goes Over Them
Generate Index KML File (Good for Large Datasets)
OK
Cancel
Apply
Help

The *3D Line Export*, *3D Area Export*, and *3D Point Export* sections allow the user to control whether or not area, line, and point features with elevation values associated with them are drawn at the terrain surface or at the elevation values associated with the feature. You can specify whether the elevation values are relative to ground level or sea level if drawing the features above the terrain. If area features are drawn above the terrain, the *Extrude Areas* option allows you to control whether or not they will also be extruded, which means they will extend back to the terrain surface, making them look like solid 3D features. If this option is not checked, the areas will just be drawn in space as a surface and not a 3D closed object. If the *Fake 2D Area Heights to Maintain Area Draw Order* option is checked, exported 2D area features will be assigned fake elevation values in order to attempt to get them to layer properly when displayed in Google Earth. This is only

necessary if you have overlapping areas that do not display in the correct order without this option checked. If point features are drawn above the terrain, the *Extrude Points* option allows you to control whether or not a thin line is drawn from the terrain surface at the location of the point to the floating symbol above the terrain surface. Enabling this option makes it easier to locate exactly where a point lies relative to the surface.

The *Filled Area Translucency* section allows the user to control the degree to which filled polygons are see-through in the created file.

The *Feature Descriptions* section allows you to setup what is contained in the description for each feature in the generated file. You can choose to include only the feature description and links to any files associated with a feature, you can choose to add attributes to this, or you can choose to provide your own HTML text to use for the feature description. If you use the HTML text option, you can embed the values of attributes from the feature in the text by enclosing the attribute name in percent signs, like %ATTR_NAME%. In addition to the name of attributes, you can also specify <Feature Name>, <Feature Desc>, <Feature Type>, <Longitude>, or <Latitude> as the attribute name to get the feature display label, description, type name, point longitude, or point latitude embedded in the result. If you need to embed an actual percent sign in your result, simply use two percent signs consecutively as an escape sequence.

The following additional options are also available:

- *Character Encoding* - this option controls the character encoding value encoded in the header of the KML file. You will typically just keep the default of iso-8859-1, but if your loaded data includes text encoded with a different character set, like UTF-8, you can select that or even type in your own encoding if something else fits your data best.
- *Create Compressed KMZ File* - if this option is checked, a compressed KMZ file will automatically be created. This will result in much smaller files and is highly recommended unless you plan on manually editing the export result yourself in a text editor.
- *Hide Point Features by Default When Loading File* - if this option is checked, all of the point features exported to the file will be hidden by default in Google Earth so as not to clutter up the display with a bunch of point icons.
- *Use Displayed Point Symbols Rather than Push-Pins for Points* - if this option is checked, each point feature will be rendered with the same symbol displayed in Global Mapper rather than using the default push-pin symbol from Google Earth. This will result in a separate PNG file for each symbol used in the output file being included with the output data to provide the symbols.
- *Display Area and Line Labels* - if this option is checked, each exported line or area feature with a display label will also be marked with a clickable placemark displaying the label for that area or line feature. This is the only way to get line or area features to display labels in Google Earth.
- *Highlight Areas in Google Earth when the Cursor Goes Over Them* - if this option is checked, area features will highlight when you move your cursor over them in Google Earth. In addition, if you checked the option to display area and line labels, the area label will be hidden until you mouse over the area, at which time the label will popup.
- *Generate Index KML File* - if this option is checked, an additional index KML file will be generated which indexes all tiles exported by the export command. This is very useful for dealing with very large data sets as it will automatically load and unload individual KML tiles as needed for display in Google Earth, much as a map catalog does in Global Mapper. With this option you can load massive data sets into Google Earth and they will still display quickly. The drawing style of the index tiles is controlled by the selected drawing style for the Coverage/Quad area type on the Area Styles tab of the Configuration dialog.

For advanced users, you can also customize what is displayed in the balloon text that appears in Google Earth when you click on a point. You are able to customize the <Balloon Style> tag to use text with the string value

stored in the registry at 'HKEY_CURRENT_USER\Software\Global Mapper\KmlExport_BalloonStyle'. If that value is empty the default setting from Google Earth will be used.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Landmark Graphics Command

The Export Landmark Graphics command allows the user to export any loaded vector data sets to a Landmark Graphics format file.

When selected, the command displays the *Landmark Graphics Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Lidar LAS Command

The Export Lidar LAS command allows the user to export any loaded 3D vector data sets (like 3D point clouds loaded from other LAS files) to new Lidar LAS format files. If the source data came from a Lidar format file, like a LAS or MrSid Lidar file, the attributes from the original data will be maintained. For other points, in addition to the base position and elevation, if there is an INTENSITY attribute available for the point, the value of that attribute will be exported as the intensity for the point in the exported LAS file.

When selected, the command displays the *Lidar LAS Export Options* dialog which allows the user to setup the export. The dialog consists of a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export LMN (Spectra Line Management Node) Command

The Export LMN (Spectra Line Management Node) command allows the user to export any loaded line features to a LMN format file for use in applications that support the LMN format. Attributes named FEATURE_GROUP, FEATURE_TYPE, and FEATURE_REP are recognized for this export and will be used if present to fill in the appropriate data fields in the exported file.

When selected, the command displays the *LMN Export Options* dialog which allows the user to set up the export. The dialog consists of a Gridding panel and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Lowrance LCM Command

The Export Lowrance LCM (MapCreate) command allows the user to export any loaded vector data sets to a Lowrance LCM format file for use in Lowrance brand GPS devices. This allows you to create custom maps for Lowrance devices from your data. Type assignment will be done based on the built-in type assignments. In addition, the MP_TYPE attribute classification used for Polish MP exports for Garmin devices will also work for Lowrance exports, so if you provide custom classifications via the MP_TYPE attribute the type mapping should work for Lowrance exports as well.

The LCM export only has support for a limited set of types. Feature types that are not supported for LCM export will not be added to the generated LCM file, so it is important to use a built-in type (or a type with a custom MP_TYPE value that is supported) when exporting to the LCM format. The following is a basic list of the types of features that are supported:

- Area Types
  - Lakes
  - Oceans
  - Parks
  - Swamp/Wetland
  - Urban Areas
- Line Types
  - Political Boundaries
  - Contours
  - Railroads
  - Roads
  - Trails
  - Streams/Rivers
- Point Types
  - Airport
  - Boat Ramp
  - Campground
  - Car Repair
  - City
  - Church
  - Department Store/Shopping
  - Gas Station/Fuel
  - Hospital
  - Navaids/Buoys
  - Pharmacy
  - Post Office
  - Restaurant
  - School
  - Water Features (Spring, Stream, Lake Name)
  - Wrecks

As the Lowrance format contains some type settings that cannot be captured with just a simple Global Mapper type selection or through the assignment of a MP_TYPE attribute, you can also use a LMC_TYPE attribute to provide a specific Lowrance type to use for some types. Here is a partial list of the supported LMC_TYPE attribute values:

- Depth Contour Line Types
  - 0x50 - black, thickness 1
  - 0x51 - blue, thickness 1
  - 0x52 - dark aqua, thickness 1
  - 0x53 - dotted aqua, thickness 1
  - 0x54 - white, thickness 1
  - 0x55 - black, thickness 2
  - 0x56 - blue, thickness 2
  - 0x57 - dark aqua, thickness 2
  - 0x58 - dotted aqua, thickness 2

- 0x59 - white, thickness 2
- 0x5A - black, thickness 3
- 0x5B - blue, thickness 3
- 0x5C - dark aqua, thickness 3
- 0x5D - dotted aqua, thickness 3
- 0x5E - white, thickness 3

When selected, the command displays the *Lowrance LCM Export Options* dialog which allows the user to set up the export. The dialog consists of a Gridding panel and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Lowrance USR Command

The Export Lowrance USR command allows the user to export any loaded vector data sets to a Lowrance USR format file for use in Lowrance brand GPS devices.

When selected, the command displays the *Lowrance USR Export Options* dialog which allows the user to set up the export. The dialog consists of a Gridding panel and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export MapGen Command

The Export MapGen command allows the user to export any loaded vector data sets to a MapGen format file.

When selected, the command displays the *MapGen Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export MapInfo MIF/MID Command

The Export MapInfo MIF/MID command allows the user to export any loaded vector data sets to a MapInfo MIF/MID format file.

When selected, the command displays the *MapInfo Export Options* dialog which allows the user to set up the export. The dialog consists of a Gridding panel and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export MapInfo TAB/MAP Command

The Export MapInfo TAB/MAP command allows the user to export any loaded vector data sets to a MapInfo TAB/MAP format file.

When selected, the command displays the *MapInfo Export Options* dialog which allows the user to set up the export. The dialog consists of a Gridding panel and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export MatLab Command

The Export MatLab command allows the user to export any loaded vector data sets to a MatLab format file.

When selected, the command displays the *MatLab Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Moss Command

The Export Moss command allows the user to export any loaded area and line vector features to a Moss format file.

When selected, the command displays the *Moss Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export NIMA ASC Command

The Export NIMA ASC command allows the user to export any loaded vector data sets to a NIMA ASC format file that can be used on many shipboard radar displays.

When selected, the command displays the *NIMA ASC Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Orca XML Command

The Export Orca XML command allows the user to export any loaded line and point vector data sets to an Orca XML format file.

When selected, the command displays the *Orca XML Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export OSM (OpenStreetMap.org) XML Command

The Export OSM (OpenStreetMap.org) XML command allows the user to export any loaded vector data sets to an OSM XML format file that can be used to provide new data to the OpenStreetMap.org web site.

When selected, the command displays the *OSM XML Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Platte River/WhiteStar/Geographix File Command

The Export Platte River/Whitestar/Geographix File command allows the user to export any loaded area features to a Platte River Digitizer/Whitestar/Geographix Township/Range ASCII format file. These files can be used with several applications.

When selected, the command displays the *Platte River Export Options* dialog which allows the user to setup the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

The township, range, section, and meridian values saved for each area feature exported are derived either from the attribute values for the area feature or the display label for "Survey Section" area types. The following attribute values names are recognized for each field:

- Township Attributes - TOWNSHIP or TWP
- Township Direction Attributes - TDIR (must have value of N or S)
- Range Attributes - RANGE or RNG
- Range Direction Attributes - RDIR (must have value of E or W)
- Section Attributes - SECTION, SECT, or SEC
- Meridian Attributes - MERIDIAN or MER

Note: Only registered users of Global Mapper are able to export data to any format.

Export PLS-CADD XYZ File Command

The Export PLS-CADD XYZ File command allows the user to export any loaded vector data sets to a PLS-CADD XYZ format file. These files can be used with the PLS-CADD software application.

When selected, the command displays the *PLS-CADD XYZ Export Options* dialog which allows the user to setup the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

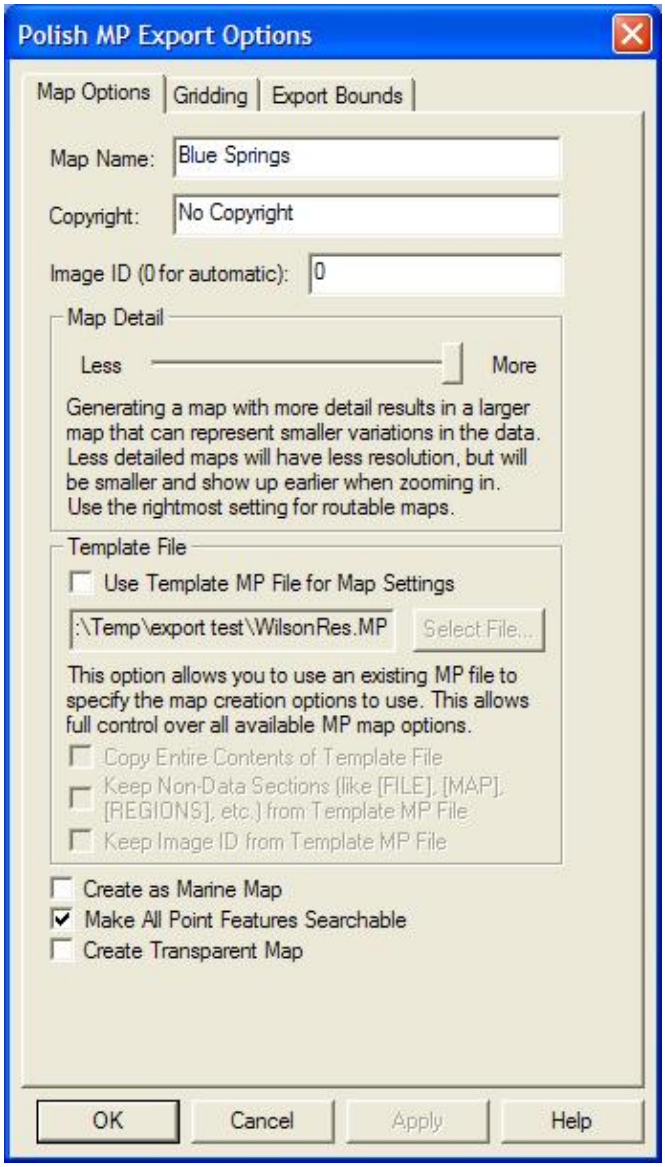
Export Polish MP (cGPSMapper) Command

TUTORIAL ALERT!

Getting Started with Global Mapper and cGPSMapper - Fantastic Guide to Creating Garmin-format Maps using Global Mapper, cGPSMapper, and the other supporting applications required to get your data into a Garmin unit as a new map.

The Export Polish MP command allows the user to export any loaded vector data sets to Polish MP format files. The Polish MP format is the input format used by the cGPSMapper application which creates custom maps for Garmin GPS units.

When selected, the command displays the *Polish MP Export Options* dialog (pictured below) which allows the user to set up the export. The dialog consists of a *Map Options* panel, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.


Polish MP Export Options
Map Options
Gridding
Export Bounds
Map Name:
Blue Springs
Copyright:
No Copyright
Image ID (0 for automatic):
0
Map Detail
Less
More
Generating a map with more detail results in a larger map that can represent smaller variations in the data. Less detailed maps will have less resolution, but will be smaller and show up earlier when zooming in. Use the rightmost setting for routable maps.
Template File
Use Template MP File for Map Settings
:\Temp\export test\WilsonRes.MP
Select File...
This option allows you to use an existing MP file to specify the map creation options to use. This allows full control over all available MP map options.
Copy Entire Contents of Template File
Keep Non-Data Sections (like [FILE], [MAP], [REGIONS], etc.) from Template MP File
Keep Image ID from Template MP File
Create as Marine Map
Make All Point Features Searchable
Create Transparent Map
OK
Cancel
Apply
Help

The *Map Name* and *Copyright* fields allow to specify the name to use for the final map when created as well as the copyright text to associate with the map.

The *Map Detail* section allows you to control at what zoom levels the final map will be viewable at. More detail results in a map that better represents the shape of the source data but that requires zooming further in to see the map, while less detail will result in a rougher map that shows up sooner. You should tailer this to the approximate scale of your source data, will the lowest detail setting approximating source vector data of around 1:250K scale and the highest detail setting representing 1:24K or better scale data.

Most built-in types already have a default zoom scale at which they will show up in built MP maps (this will translate to a Levels= value for the feature in the exported MP file based on the levels in the MP file header). For custom types and for types that you want to change the default zoom scale for, you can add a MP_BIT_LEVEL attribute to the feature itself or to the default attribute list for a feature type. The value of this attribute should specify the minimum MP zoom bit level that a feature should appear at. For example, if you use the maximum *Map Detail* setting with no template file, you will get a map with populated zoom levels at 24, 22, and 20 bits. If you wanted a feature to show up in just the lower 2 zoom levels of that map (the 24 and 22 bit resolution layers), you could add a MP_BIT_LEVEL attribute with a value of 22 to your feature or the default attribute list for that type, then that feature would get a Levels=2 value written to the exported MP file. If your map had less detail (say zoom levels of 21, 19, and 17 bits), the same feature would only show up in the most detailed 21 bit layer as features are always present in at least one layer of the map. If you want a feature to always show up at all zoom levels in your map regardless of what zoom levels are present, just add a MP_BIT_LEVEL attribute with a value of 1.

The *Template File* sections allows you to select a file to use as a template for the new MP file. The new file with use all of the settings from the selected template file except for the map ID (unless you check the *Keep Image ID from Template MP File* option) and, if you provide a map name, the map name. This includes the Dictionary setting and all levels settings. This provides a way for advanced users to set up one MP file exactly how they want and then export new maps with the same settings. You can also check the *Copy Entire Contents of Template File* option to have everything from the template file copied to the new file verbatim, including any feature data in the template file.

If selected, the *Create as Marine Map* option specifies that the created MP file will be marked as a marine map and marine features will be used if appropriate. Note that the Marine version of cGPSMapper is required to create marine maps.

The *Make All Point Features Searchable* controls whether or not all point features in the final map created from the MP file should be searchable on the GPS device. If the *Create Transparent Map* option is selected the map will be marked as transparent and any data under the map will show through.

When Global Mapper exports loaded vector data to a MP file, it will automatically attempt to determine the best type to save in the MP file based on the classification of the feature in Global Mapper. If no type mapping is known, the name of the assigned Global Mapper classification will be used for the 'Type' value in the MP file. If you updated your RgnTypes.txt file in your cGPSMapper folder with the type names and the appropriate type number, you can make this work as well. You can also manually specify the type number to use for a feature by adding an attribute named MP_TYPE with the type value to use as the attribute value. If the value that you provide is for a marine type you should also provide an attribute with a name of MARINE and a value of Y. You can also override the default type mapping for built-in types by adding a default attribute list for the type on the * Styles tab of the Configuration dialog. Just add a MP_TYPE attribute to the default attribute list for a type to manually specify what type to use in exported MP files for a given Global Mapper type.

Global Mapper will automatically convert exported data to the appropriate projection and datum for export so that the Polish MP file will be correctly positioned. By default this will be lat/lon degrees with the WGS84 datum, although if you use a template file that specified a different recognized datum, Global Mapper will instead convert to that datum automatically. In any case, Global Mapper will always automatically do the right thing.

Advanced Users: If you aren't use a template to configure your export, you can customize the values used for several settings in the header for adding registry keys. The following values are supported:

- TreSize - Add a DWORD registry value using 'regedit' at 'HKEY_CURRENT_USER\Software\Global Mapper\MPExport_TreSize' with your desired value.
- RgnLimit - Add a DWORD registry value using 'regedit' at 'HKEY_CURRENT_USER\Software\Global Mapper\MPExport_RgnLimit' with your desired value.

Note: Only registered users of Global Mapper are able to export data to any format.

Export SEGP1 Command

The Export SEGP1 command allows the user to export any loaded 3D line and point vector data sets to a SEGP1 format file.

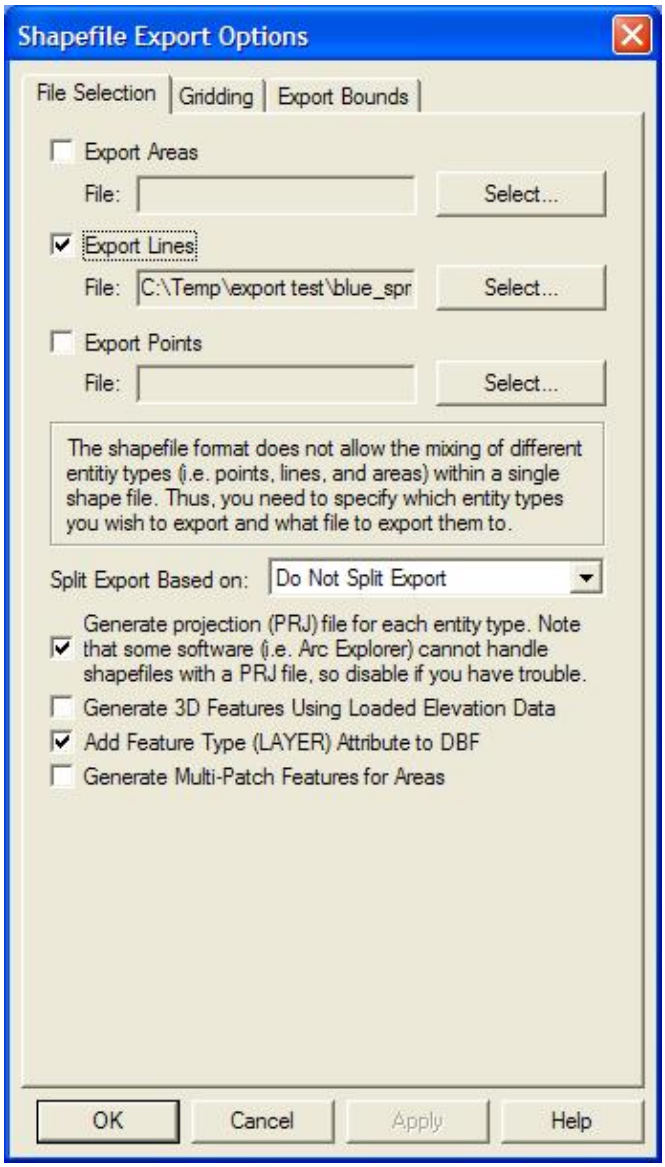
When selected, the command displays the *SEGP1 Export Options* dialog which allows the user to set up the export. The dialog consists of a Gridding panel and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Shapefile Command

The Export Shapefile command allows the user to export any loaded vector data sets to ESRI Shapefile format files.

When selected, the command displays the *Shapefile Export Options* dialog (pictured below) which allows the user to set up the export. The dialog consists of a *File Selection* panel, a Gridding panel, and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.


Shapefile Export Options
File Selection
Gridding
Export Bounds
Export Areas
File:
Select...
Export Lines
File: C:\Temp\export test\blue_spr
Select...
Export Points
File:
Select...
The shapefile format does not allow the mixing of different entitiy types (i.e. points, lines, and areas) within a single shape file. Thus, you need to specify which entity types you wish to export and what file to export them to.
Split Export Based on: Do Not Split Export
Generate projection (PRJ) file for each entity type. Note that some software (i.e. Arc Explorer) cannot handle shapefiles with a PRJ file, so disable if you have trouble.
Generate 3D Features Using Loaded Elevation Data
Add Feature Type (LAYER) Attribute to DBF
Generate Multi-Patch Features for Areas
OK
Cancel
Apply
Help

The *Export Areas*, *Export Lines*, and *Export Points* options enable area, line, and point export respectively. Pressing the *Select...* button next to each of those options allows you to select the name of the SHP file to generate. In addition to the SHP file containing the actual geometry of the features, an shape index file (SHX) and attribute database file (DBF) will be created as well with the same name as the SHP file.

In general, Global Mapper will automatically determine an appropriate field type and length for any attributes exported to the DBF file created along with a Shapefile based on the values of the attribute data being exported. However, if your input data includes Shapefiles or DBF files, the original field type and length for an attribute will be used unless the attribute values being exported make that impossible.

The *Split Export Based On* option allows you to split up your export into separate files based on the feature type/classification, feature description, feature name, or any attribute found in the loaded data. If you choose the **Split on Feature Type** option, you will get the export split based on the feature classification, except in the case of the unknown types, in which case the feature description will be used automatically. The type/description/name/attribute value of the features stored in each file will be appended on to the end of the selected filenames.

If selected, the *Generate Projection (PRJ) File* option causes a projection file describing the ground reference system of the shapefile to be generated for each shapefile created. The PRJ files will have the same name as the SHP file with the .prj extension.

If selected, the *Generate 3D Features Using Loaded Elevation Data* option specifies that 3D objects should be created in the shapefile. The elevation stored for each vertex/point will be the first of the following which is available:

- The elevation associated with the vertex/point in question.
- The elevation associated with the entire feature being exported. For example, the elevation of a contour line.
- The first elevation obtained by searching the loaded elevation grid layers at the position of the vertex/point.
- A value of 0.0 will be used if no elevation could be obtained via any of the prior methods.

If selected, the *Add Feature Type (LAYER) Attribute to DBF* option specifies that the type description for each exported feature will be added as a LAYER attribute to the DBF file generated with the SHP file.

If selected, the *Generate Multi-Patch Features for Areas* option specifies that multi-patch features should be generated for area exports rather than normal polygon records. This is useful for exporting 3D models, such as those you would load from Google SketchUp SKP files.

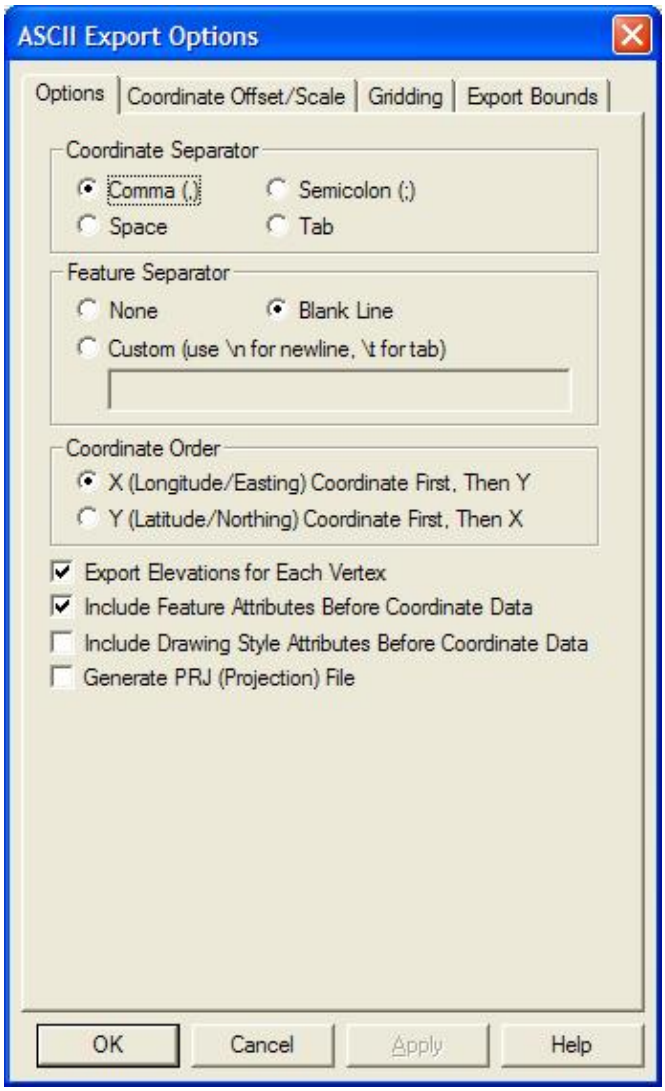
WARNING: The Shapefile format uses a DBF file for attribute storage, which means that any attribute names are limited to 10 characters. Any attribute names longer than that will be truncated with a number potentially added on to maintain uniqueness among multiple long attribute names.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Simple ASCII Text File Command

The Export Simple ASCII Text File command allows the user to export any loaded vector data sets (i.e. areas, lines, and points) to a delimited ASCII text file. Each vertex in an area or line and the position of each point will be represented.

When selected, the command displays the *ASCII Export Options* dialog which allows the user to setup the export. The dialog consists of an *Options* panel (pictured below) and an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.



The *Options* panel allows the user to specify what character to user to separate the x, y, and z coordinates of each vertex. In addition, the user can specify that they wish to separate each vector feature with a blank line or some other custom separator text. The *Coordinate Order* section allows the user to control the order in which the X (easting/longitude) and Y (northing/latitude) coordinates are exported. The export of elevation data is controlled with the *Export Elevations* option. The *Include Feature Attributes Before Coordinate Data* and *Include Drawing Style Attributes Before Coordinate Data* options respectively control whether or not feature attributes or feature drawing style information is saved to the file on the lines preceding the coordinate data for a feature.

If elevations are being exported, Global Mapper first looks for an elevation associated with the vertex being exported. If no elevation is associated with the vertex, Global Mapper then checks all loaded elevation grid data in reverse order of display to see if any of them have an elevation at the vertex location. If so, that elevation is used.

ADVANCED USERS - In Global Mapper v11.02 and later you can customize the number of decimal digits written out for the X and Y coordinates for a Simple ASCII Text export through the use of a DWORD registry key 'HKEY_CURRENT_USER\Software\Global Mapper\ASCIIExportCoordPrecision'. For example, set this value to 6 to get 6 decimal digits for each X, Y, and Z coordinate.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Surfer BLN Command

The Export Surfer BLN command allows the user to export any loaded vector data sets to a Surfer BLN format file used by Golden Software's Surfer package to specify breaklines.

When selected, the command displays the *Surfer BLN Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export SVG Command

The Export SVG command allows the user to export any loaded vector data sets to a SVG (Scalable Vector Graphic) format file suitable for display on the web.

When selected, the command displays the *SVG Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Tom Tom OV2 Command

The Export Tom Tom OV2 command allows the user to export any loaded point data sets to a Tom Tom OV2 format file for use in creating POI databases for Tom Tom GPS devices.

When selected, the command displays the *Tom Tom OV2 Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export Tsunami OVR Command

The Export Tsunami OVR command allows the user to export any loaded vector data sets to a Tsunami OVR format file for use in the Tsunami software package.

When selected, the command displays the *Tsunami OVR Export Options* dialog which allows the user to set up the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export UKOOA P/190 Command

The Export UKOOA P/190 command allows the user to export any loaded 3D line and point vector data sets to an UKOOA P/190 format file.

When selected, the command displays the *UKOOA Export Options* dialog which allows the user to set up the export. The dialog consists of a Gridding panel and an Export Bounds panel which allows the user to set up the portion of the loaded vector data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export WAsP MAP File Command

The Export WAsP MAP File command allows the user to export loaded line and area features to a WAsP MAP format file for use with the WAsP (Wind Analysis and Application Program) application (http://www.wasp.dk/.

Only those line features with an elevation and/or valid roughness attributes will be exported. Only those area features with valid roughness attributes will be exported. Valid roughness attributes consist of a ROUGH_L and a ROUGH_R attribute containing numeric values for the left and right roughness for the feature. If neither of those attributes exist but a RV, ROUGHNESS, or ROUGH attribute is available, that value will be used for both the left and right roughness for that feature.

When selected, the command displays the *WAsP MAP Export Options* dialog which allows the user to setup the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

Note: Only registered users of Global Mapper are able to export data to any format.

Export ZMap+ XYSegId File Command

The Export ZMap+ XYSegId File command allows the user to export loaded line and area features to a ZMap+ text format file for use with applications like Landmark Graphics..

When selected, the command displays the *ZMap+ XYSegId Export Options* dialog which allows the user to setup the export. The dialog consists of an Export Bounds panel which allows the user to set up the portion of the loaded data they wish to export.

This format costs of one line per each input coordinate, with the X coordinate followed by the Y coordinate (optionally with a Z if available), followed by the feature index in the file. The following is short sample of an output file with a couple of features:

```
924800.1        10593255.0      1.
919970.1        10590840.0      1.
915623.0        10586976.0      1.
914174.0        10579248.0      1.
919487.0        10573451.0      1.
927215.1        10569587.0      1.
933977.3        10568138.0      1.
938324.3        10575867.0      1.
937358.3        10586493.0      1.
934460.2        10593255.0      1.
927698.3        10594221.0      1.
924800.1        10593255.0      1.
884645.6        10557271.0      2.
887543.7        10549543.0      2.
893822.8        10540849.0      2.
900584.8        10539400.0      2.
906380.8        10543264.0      2.
```

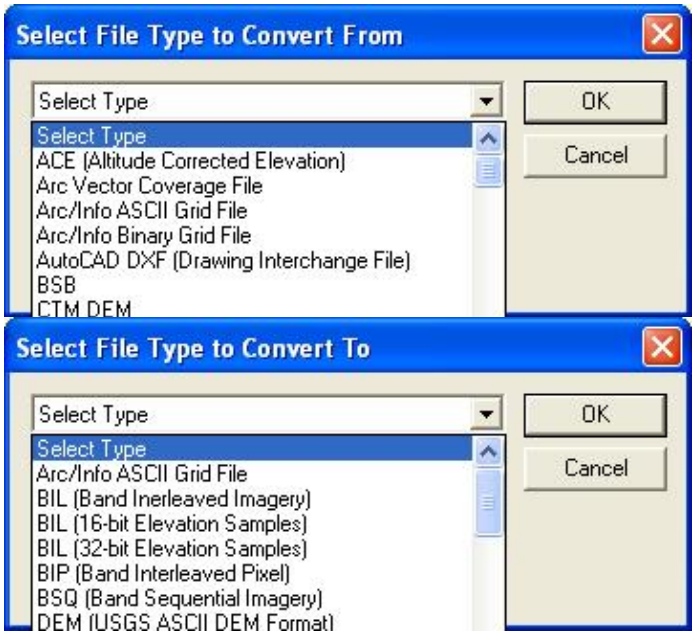
```
907829.9        10554373.0      2.
900584.8        10565965.0      2.
895271.8        10567414.0      2.
886094.7        10565965.0      2.
884645.6        10557271.0      2.
876917.6        10524427.0      3.
870155.4        10518630.0      3.
865808.5        10512834.0      3.
861944.4        10503657.0      3.
865325.6        10494963.0      3.
871121.6        10493997.0      3.
880781.6        10496895.0      3.
889475.8        10499793.0      3.
890924.8        10509936.0      3.
889475.8        10518147.0      3.
884645.6        10524910.0      3.
876917.6        10524427.0      3.
```

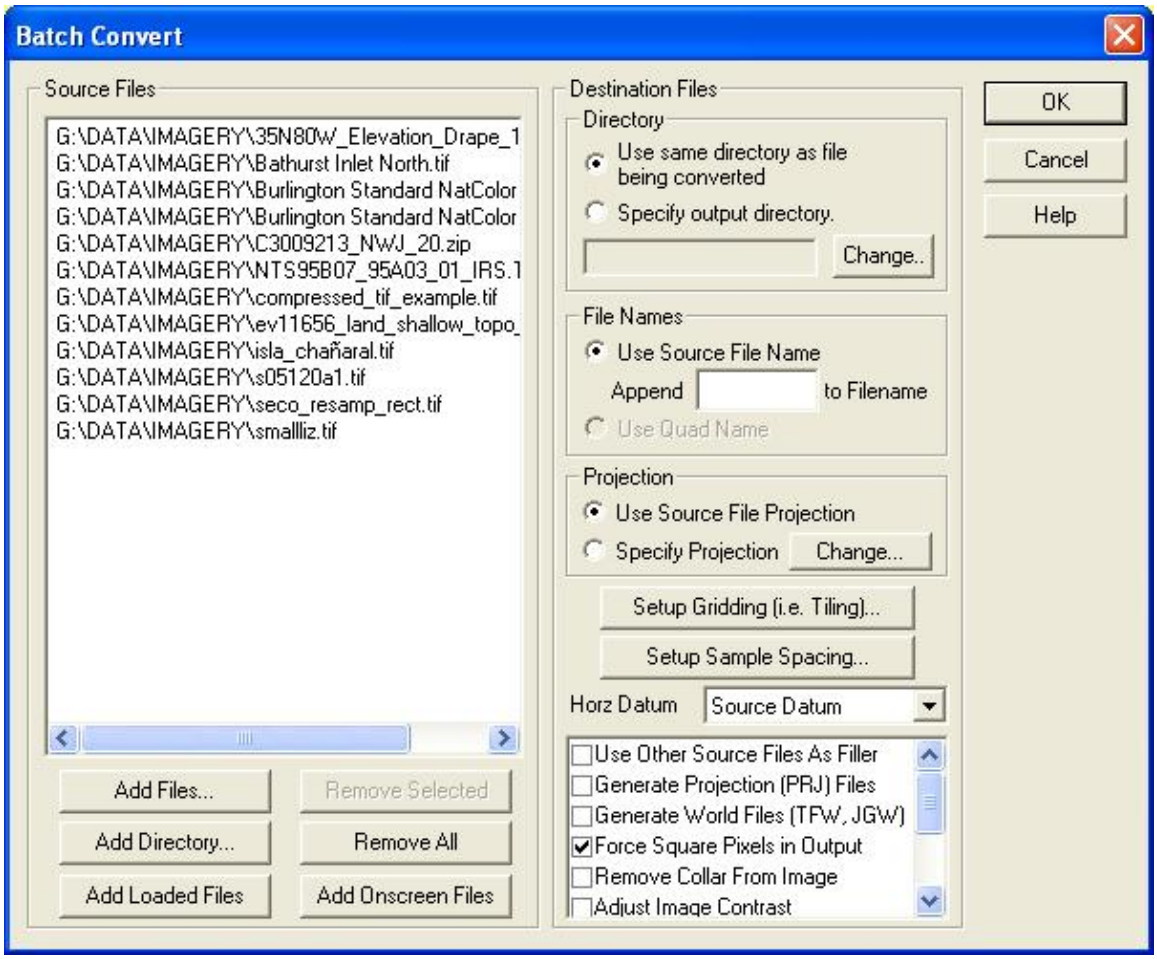
Note: Only registered users of Global Mapper are able to export data to any format.

Batch Convert/Reproject

The Batch Convert/Reproject command allows the user to easily convert multiple files in one format to another format.

When the command is selected, the user is first prompted to select the file type to convert from using the dialog pictured below. Once an input file type is selected, another dialog with a list of all compatible export file types is displayed, allowing the user to select what type of file to convert the input files to. Finally, after the input and output file types are selected, the *Batch Convert* dialog (pictured below) is displayed, allowing the user to set up the batch conversion.





The *Source Files* section displays the list of source files currently selected to be converted. Pressing the *Add Files...* button allows the user to select additional files for conversion. Pressing the *Add Directory...* allows the user to easily add an entire directory's worth of source files to the to-be-converted list. All directories under the added one can be recursively searched if so desired by answering Yes to the dialog that pops up immediately after selecting the directory. Pressing the *Add Loaded Files* button causes all files loaded into the main Global Mapper view that match that batch convert input type to be added to the list of files to be converted. Pressing the *Add Onscreen Files* button causes all files loaded into the main Global Mapper view that are currently at least partially onscreen and that match the batch convert input type to be added to the list of files to be converted.

The *Directory* section allows the user to choose where they would like the newly created output files to be created. The *Use same directory as file being converted* option causes the output file created off of each source file to be created in the same directory as the source file. The *Specify output directory* option allows the user to choose a specific directory to output all of the newly created output files to.

The *File Names* section allows the user to choose whether the newly created output files should have the same file name as the source file they were created from (*Use Source File Name* option) or whether the more readable quadrangle name (if available) or layer descripiton should be used as the file name for the newly created output file (*Use Quad Name or Description* option). If the *Use Source File Name* option is selected, you can also specify an additional text string to append to each new filename to identify it.

The *Projection* section allows the user to choose whether or not each newly created output file should either use the same projection as the file that it was created from (*Use Source File Projection* option) or if each file

should use a projection specified by pressing the *Projection* button. If the user selects to specify an output projection and they select a zoned projection like UTM or Gauss Krueger, they will have the option on the projection selection dialog to have the best zone for the center of the output map automatically used if they select the *Automatically Select Best Zone* option in the Zone box on the projection selection dialog.

The *Setup Gridding (i.e. Tiling)* button displays a dialog allowing the user to specify if and how to break up each file being converted into multiple new files. This option is only available when converting to a raster or gridded elevation format.

The *Setup Sample Spacing* button displays a dialog allowing the user to choose to either keep the sample spacing of source raster and elevation files when converting the selected or to specify a new sample spacing to resample all of the selected input files at when performing the conversion. This option is only available when converting to a raster or gridded elevation format.

The *Horz Datum* selection allows the user to choose the horizontal datum that each newly created output file should use. By default, each output file will use the same horizontal datum as the source file that it was created off of. Alternately, the user can specify to have all output files created in NAD27, NAD83, WGS72, or WGS84 with the appropriate offset being applied automatically.

The *Vertical Units* selection is present only for some conversions and controls the output elevation units.

The *Palette* selection is present only for some conversions and controls the palette, if any, used in the output files. The palette values are defined as follows:

- *Image Optimized Palette* - The palette generated will be an optimal mix of up to 256 colors that will closely represent the full blend of colors in the source images. This option will generate the best results, but can more than double the export time required if any high color images are present in the export set. If all of the input data is palette-based and the combined palette of those files has 256 colors or less, then the combined files of the input file will just be used with no additional export time being required.
- *Grayscale Palette* - This palette consists of 256 scales of gray ranging from black to white.
- *DRG Optimized Palette* - This palette is optimized for the exporting USGS DRG data. The palette consists of only the standard DRG colors.
- *DRG/DOQ Optimized Palette* - As the name suggests, this palette is optimized for exporting a mixture of USGS DRG data and grayscale satellite photos (i.e. USGS DOQs). The palette consists of the 14 standard DRG colors with the remaining 242 colors being a range of gray values ranging from black to white.
- *Halftone Palette* - The palette consists of a blend of 256 colors evenly covering the color spectrum. This palette is the best choice when exporting anything but DRGs and grayscale satellite photos.
- *Custom Palette from File* - This option allows the user to choose a .pal file describing the palette to use for the export. A .pal file should be a text file with one line per color, with the red, green, and blue color components for each color in the palette separated by a comma. You can save a .pal file for an existing palette-based file by opening the Overlay Control Center, selecting the palette-based layer, press Options, then the Transparent Color button, then selecting the option to save a color palette file.
- *24-bit RGB* - Create a full 24-bit color image with no palette. This will create the best resulting image but will also take the most space.
- *Keep Same as Source File* - The new file will use the same color encoding as the source file, either palette-based, 24-bit RGB, multi-band, or grayscale.
- *Multi-Band Image* - The new file will use be a multi-band image using the same number of bands as the input file. You will be able to choose either 8-bits or 16-bits per band.

The additional list of options varies depending on the particular conversion being performed. The meaning of those options is defined below:

- *Add Watermark Image* - when this option is checked, you will be prompted to select an image to use as a watermark for your raster format export. You will also be allows to select display options for your watermark image, such as transparency, to provide the desired effect. The selected watermark image will be stretched to cover the entire output image for each converted file.
- *Adjust Image Contrast* - causes the contrast of any input file to be automatically adjusted prior to being exported. This is useful for improving the display of some types of imagery.
- *Clamp Export to Lat/Lon Boundary* - causes the export bounds of each image being converted to be clamped to the nearest 3.75' lat/lon boundary. This can be useful in limited cases, such as when reprojecting to geographic/arc degrees and the source images had a tiny collar to make the image square in the native projection.
- *Convert to Grayscale* - causes the exported imagery to be generated in only shades of gray.
- *Crop to Selected Areas* - this option specifies that each exported file will be cropped to any area features selected with the Feature Info or Digitizer Tools. If this option is selected, no output file will be generated for any input file that does not intersect any of the selected crop areas.
- *Export Areas*, *Export Lines*, and *Export Points* - these options respectively control whether area, line, and/or point shapefiles are generated from the source vector data files. At least one of these options must be selected.
- *Fill Small Gaps in Data* - this option specifies whether or not small gaps in the elevation or raster file being exported will be filled by interpolating between nearby known values.
- *Force Square Pixels in Output* - causes the newly created files to have square pixels in whatever projection they are created in. This allows the files to be used with the widest variety of other software packages, many of which do not correctly handle non-square pixels.
- *Generate Projection (PRJ) File* - causes a projection file describing the ground reference system of the output file to be generated for each output file in addition to the output file itself. The PRJ file will have the same name as the output file with the .prj extension.
- *Generate World File* - causes a world file describing the location of the output file to be generated for each output file. The world file will have the same name as the output file with the appropriate world file extension for the output type (i.e. TFW for GeoTIFF, JGW for JPEG, etc.).
- *Include Display Labels as Attributes* - causes DXF attributes containing the name of the vector object to be associated with DXF POLYLINE entities. As some software packages cannot handle attributes in DXF files, you may have to turn this option off (with the associated loss of information) to get your exported DXF files to work with some packages.
- *Include Feature Attributes in DBF* - causes the attributes other than layer and elevation of each feature (if any) to be stored in the DBF file associated with the generated Shapefile. In addition, selecting this option will cause the DLG-3 attribute codes matching each feature to be stored in the DBF file.
- *Include Feature Names in DBF* - causes the name of each feature (if any) to be stored as a NAME attribute in the DBF file associated with the generated Shapefile.
- *Make Single Color Transparent* - allows the user to select a single color to treat as transparent in the source data files.
- *Minimize Window During Conversion* - this option causes the main map window to immediately be minimized when the batch conversion operation begins and stay that way until the operation completes.
- *Never Anti-Alias Pixels (Interpolate)* - this option disables anti-aliasing (interpolation) even for those layers to which it would normally be applied by default (like gridded elevation layers) or imagery being reprojected or resampled.
- *Never Automatically Adjust Contrast* - this option disables automatic contrast adjustment even for those layers to which it would normally be applied by default (like 16-bit per color channel images).

- *Only Generate Metadata Files* - causes only metadata files like world files, PRJ files, and TAB files to be generated. This is a very handy way to create metadata files for a large collection of files like GeoTIFF files in order to use the data in software that doesn't recognize embedded positioning information.
- *Remove Collar From Image* - causes the collar of DRG-style images to be automatically removed from each image that is converted if collar bounds can be automatically determined. Note that some collar may remain in order to make the end result rectangular if the destination projection in not geographic lat/lon. If you check this option and the file being converted is also loaded in the main map view and has some custom collar cropping applied, those collar cropping options will be used rather than the automatic DRG-style collar setting.
- *Skip Existing Output Files* - this option causes any conversion operations for which the default output filename already exists to be skipped. This is useful when resuming batch conversion operations that failed or were cancelled.
- *Use Big Endian For Elevations* - causes stored elevations to use the big-endian (Motorola) byte order rather than the default little-endian (Intel) byte order.
- *Use Lossless Compression* - this option causes the lossless compression method to be used when generating Global Mapper Grid files. If it is not checked, some minor loss of data in areas of high terrain relief will be allowed in order to achieve a higher compression ratio.
- *Use Other Source Files As Filler* - causes all selected source files to be loaded and made available during export to fill holes in the main file being converted. This is useful when you have a collection of files that are being reprojected and you do not want to have a sliver around the edge of each new file filled with the background color when the source data does not make a perfect rectangle. You can even mark some files to only be used as filler by right clicking on them in the Files list and selecting the appropriate option in the popup menu.
- *Use Tile Layout* (ADVANCED USERS ONLY) - specifies that any exported GeoTIFF files should be organized in tiles rather than strips.

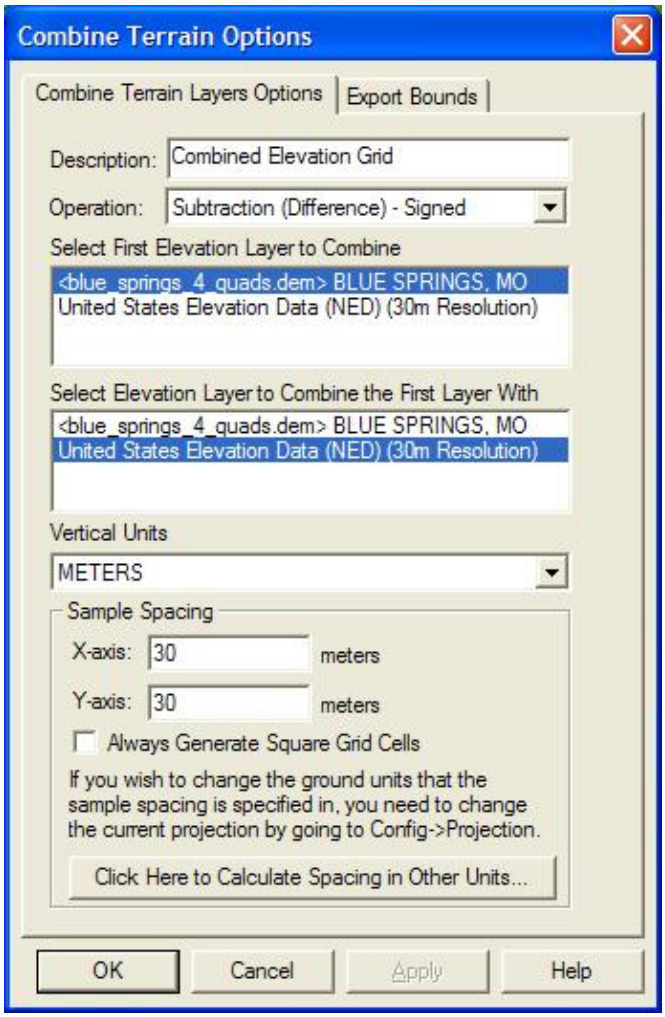
You can also right click on the list of files to convert and choose to save that list of files to a text file. This can be a convenient way to start a Global Mapper script to do other processing on the files. Other right-click options include the ability to remove all archive files, like .zip and .tar.gz from the list and to fill the source files list with files listed in a text file.

Note: Only registered users of Global Mapper are able to perform batch conversions.

Combine Terrain Layers Command

The Combine Terrain Layers command allows the user to generate a new gridded elevation (or other gridded value) layer by combining and/or comparing the elevation values from two other loaded terrain layers.

When selected, the command displays the *Combine Terrain Options* dialog which allows the user to set up generation of the new terrain layer. Once completed the new terrain layer is added to the Overlay Control Center and displayed.



The *Combine Terrain Layers Options* panel (displayed above) allows the user to select the name to assign to the newly generated layer, select the layers to combine to make the new layer, select the operation to perform when combining the new layer, and select the vertical units and sample spacing of the new layer. The available operations are described below:

- **Addition** - values from each layer are added to each other
- **Subtraction (Difference) - Signed** - value in new layer is assigned to the difference between the value in the first layer and the value in the second layer
- **Subtraction (Difference) - Unsigned** - value in new layer is assigned to the magnitude (absolute value) of the difference between the value in the first layer and the value in the second layer
- **Average Elevation** - value in new layer is assigned to the average of the value in the first layer and the value in the second layer
- **Minimum Elevation** - value in new layer is assigned to the smaller of the value in the first layer and the value in the second layer
- **Maximum Elevation** - value in new layer is assigned to the larger of the value in the first layer and the value in the second layer
- **Multiply Values** - value in new layer is assigned to the product of the value in the first layer and the value in the second layer
- **Divide 1st Value by 2nd** - value in new layer is assigned to the value from the first layer divided by the value in the second layer. If either value is missing or the second layer value is zero the new sample is marked as invalid.

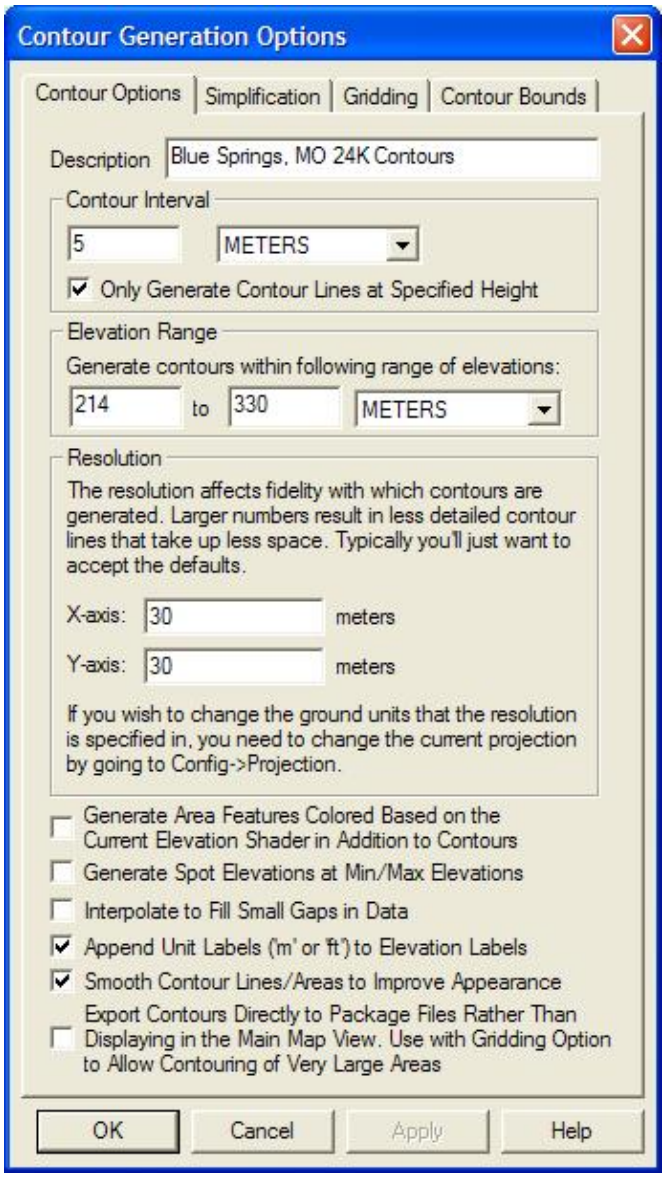
- **Filter (Keep First Value if Second Valid)** - value in the new layer is assigned to the value in the first layer only if the value in the second layer is vaild. Otherwise the value in the new layer is marked as invalid (void). This is useful for applying a mask to a terrain layer.
- **Filter (Keep First Value if Greater Than Second)** - value in the new layer is assigned to the value in the first layer only if the first layer value is greater than the second layer value. If either value is invalid or the first value is less than the second value, the value in the new layer is marked as invalid (void).
- **Filter (Keep First Value if Less Than Second)** - value in the new layer is assigned to the value in the first layer only if the first layer value is less than the second layer value. If either value is invalid or the first value is less than the second value, the value in the new layer is marked as invalid (void).

Note: Only registered users of Global Mapper are able to combine terrain layers.

Generate Contours Command

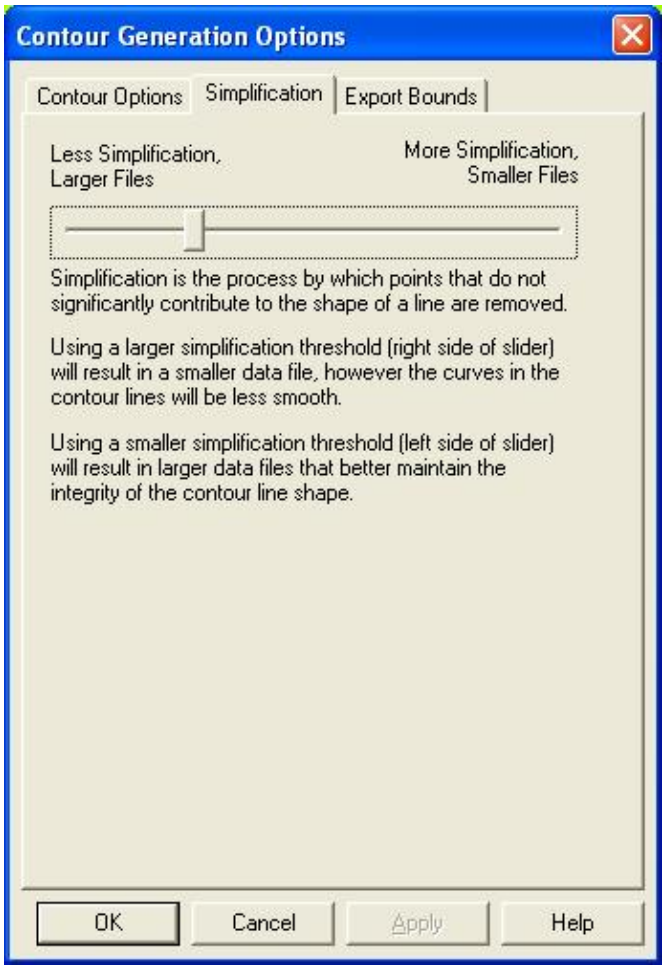
The Generate Contours command allows the user to generate equally spaced contour lines from any loaded elevation grid data.

When selected, the command displays the *Contour Generation Options* dialog (pictured below) which allows the user to set up the contour generation process.


Contour Generation Options
Contour Options
Simplification
Gridding
Contour Bounds
Description
Blue Springs, MO 24K Contours
Contour Interval
5
METERS
Only Generate Contour Lines at Specified Height
Elevation Range
Generate contours within following range of elevations:
214
to
330
METERS
Resolution
The resolution affects fidelity with which contours are generated. Larger numbers result in less detailed contour lines that take up less space. Typically you'll just want to accept the defaults.
X-axis:
30
meters
Y-axis:
30
meters
If you wish to change the ground units that the resolution is specified in, you need to change the current projection by going to Config->Projection.
Generate Area Features Colored Based on the Current Elevation Shader in Addition to Contours
Generate Spot Elevations at Min/Max Elevations
Interpolate to Fill Small Gaps in Data
Append Unit Labels ('m' or 'ft') to Elevation Labels
Smooth Contour Lines/Areas to Improve Appearance
Export Contours Directly to Package Files Rather Than Displaying in the Main Map View. Use with Gridding Option to Allow Contouring of Very Large Areas
OK
Cancel
Apply
Help

The *Contour Options* panel (displayed above) allows the user to set the contour interval and units as well as the grid spacing to use when generating the contours. You can also restrict the elevation range within which contour lines are generated (by default all loaded elevation values are considered). In addition, options are available to generate isoheight area features in addition to contour lines as well as spot elevations at the highest and lowest points in the area over which the contours are generated. The smoothing option controls whether or not extra vertices are added along generated line and area features to improve their appearance. If you need to generate a huge amount of contour lines over a large area, the option to export the contours directly to a package file can be used in addition to the Gridding tab options to export those contours directly to package files to get around memory limitations. Note that the contour lines will be generated so that the higher elevations are to the left of the contour line.

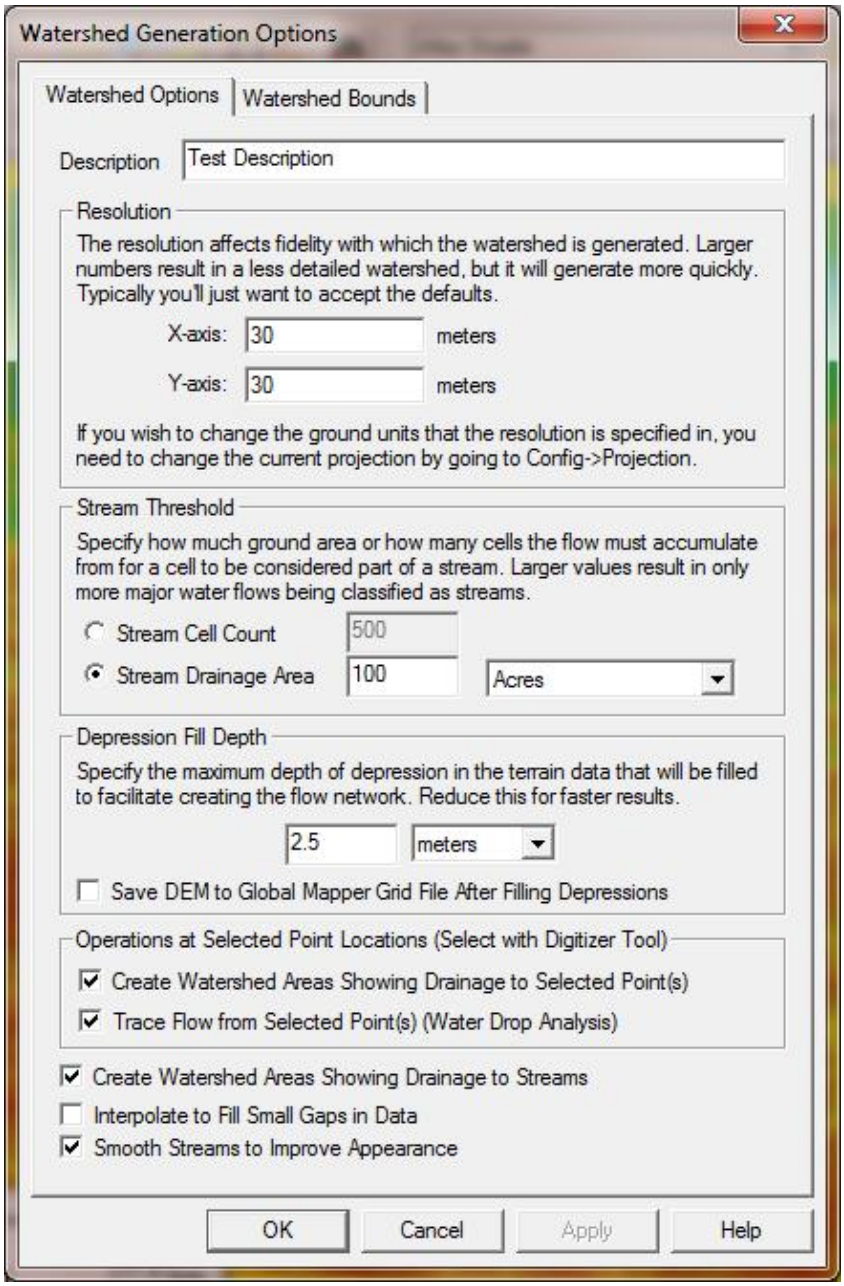
The *Simplification* panel (displayed below) allows the user to set up the threshold at which points that don't contribute much to the shape of the generated contour are removed in order to generate lines with less vertices. The Gridding panel allows you to break up your contour generation into smaller pieces which can sometimes help reduce memory requirements when generating a very large amount of contour lines. The Export Bounds panel allows the user to set up the portion of the loaded elevation grid data they wish to consider when generating the contours.


Contour Generation Options
Contour Options
Simplification
Export Bounds
Less Simplification,
Larger Files
More Simplification,
Smaller Files
Simplification is the process by which points that do not significantly contribute to the shape of a line are removed.
Using a larger simplification threshold (right side of slider) will result in a smaller data file, however the curves in the contour lines will be less smooth.
Using a smaller simplification threshold (left side of slider) will result in larger data files that better maintain the integrity of the contour line shape.
OK
Cancel
Apply
Help

Generate Watershed Command

The Generate Watershed command allows the user to perform a watershed analysis on loaded terrain data to find stream paths as well as delineate the watershed areas that drain into a given stream section. The watershed calculation uses the eight-direction pour point algorithm (D-8) to calculate the flow direction at each location, along with a bottom-up approach for determining flow direction through flat areas and a custom algorithm for automatically filling depressions in the terrain data.

When selected, the command displays the *Watershed Generation Options* dialog (pictured below) which allows the user to set up the watershed generation process.


Watershed Generation Options
Watershed Options
Watershed Bounds
Description
Test Description
Resolution
The resolution affects fidelity with which the watershed is generated. Larger numbers result in a less detailed watershed, but it will generate more quickly. Typically you'll just want to accept the defaults.
X-axis:
30
meters
Y-axis:
30
meters
If you wish to change the ground units that the resolution is specified in, you need to change the current projection by going to Config->Projection.
Stream Threshold
Specify how much ground area or how many cells the flow must accumulate from for a cell to be considered part of a stream. Larger values result in only more major water flows being classified as streams.
Stream Cell Count
500
Stream Drainage Area
100
Acres
Depression Fill Depth
Specify the maximum depth of depression in the terrain data that will be filled to facilitate creating the flow network. Reduce this for faster results.
2.5
meters
Save DEM to Global Mapper Grid File After Filling Depressions
Operations at Selected Point Locations (Select with Digitizer Tool)
Create Watershed Areas Showing Drainage to Selected Point(s)
Trace Flow from Selected Point(s) (Water Drop Analysis)
Create Watershed Areas Showing Drainage to Streams
Interpolate to Fill Small Gaps in Data
Smooth Streams to Improve Appearance
OK
Cancel
Apply
Help

The Resolution section controls the resolution at which the loaded terrain data is sampled to perform the watershed analysis. The default values should capture the full resolution of the loaded terrain data. Larger values (i.e. lower resolution) will cause the calculation to be quicker, but less detailed.

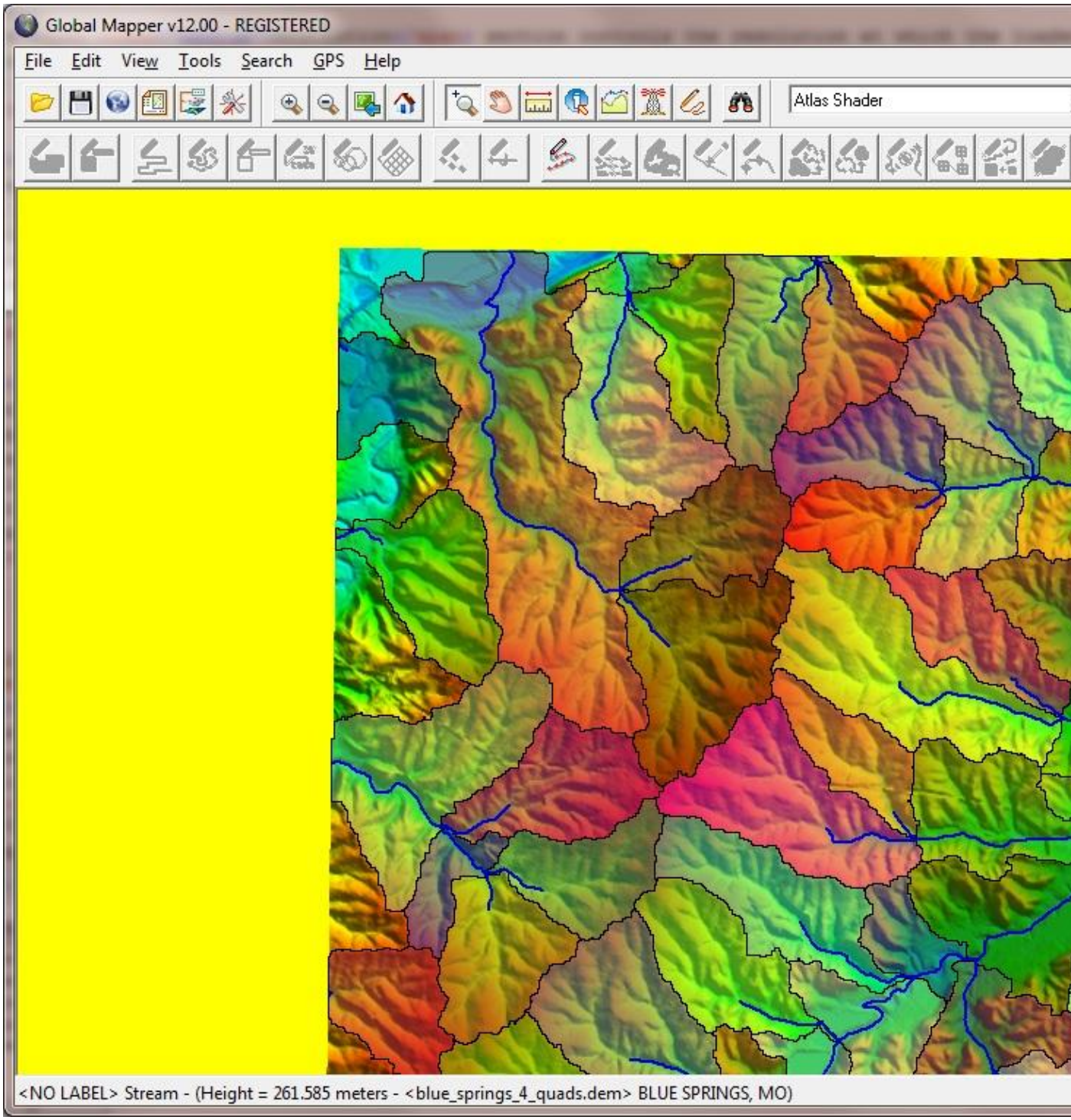
The Stream Threshold section controls how much water must flow to a particular cell before it is considered part of a "stream". Larger values will result in only more water flow areas being delineated, while smaller values will cause more minor water flows to be marked as streams. Each stream segment (i.e. the portion between and inflow and outflow point) can optionally have the area that drains directly to that stream segment marked with a watershed area. Check the Create Watershed Areas Showing Drainage to Streams option to enable creating watershed areas.

Many terrain data sets will contain depressions in the data where flow would terminate unless allowed to fill the depression and spill into the surrounding terrain. The Depression Fill Depth section controls how deep of a

depression will be filled before it is considered a basin and flow is allowed to terminate there. The depression fill depth value will automatically be filled in with some guess at a good value based on the range of loaded elevation values, but you might want to modify this, especially if you have relatively flat terrain with a lot of depressions. Note that it can take a while to fill particularly deep depressions. When trying to determine a a good value to use for the depression fill depth you should think about how high of an embankment or 'dam' that you might encounter that you want to allow water to fill up to the top of and pour over, or also how deep of a small pond or puddle to fill and allow spilling out of. You can also check the option to *Save DEM to Global Mapper Grid File After Filling Depressions* to save the depression-filled terrain to a GMG file so you can load that for future watershed operations to avoid having to fill depressions again.

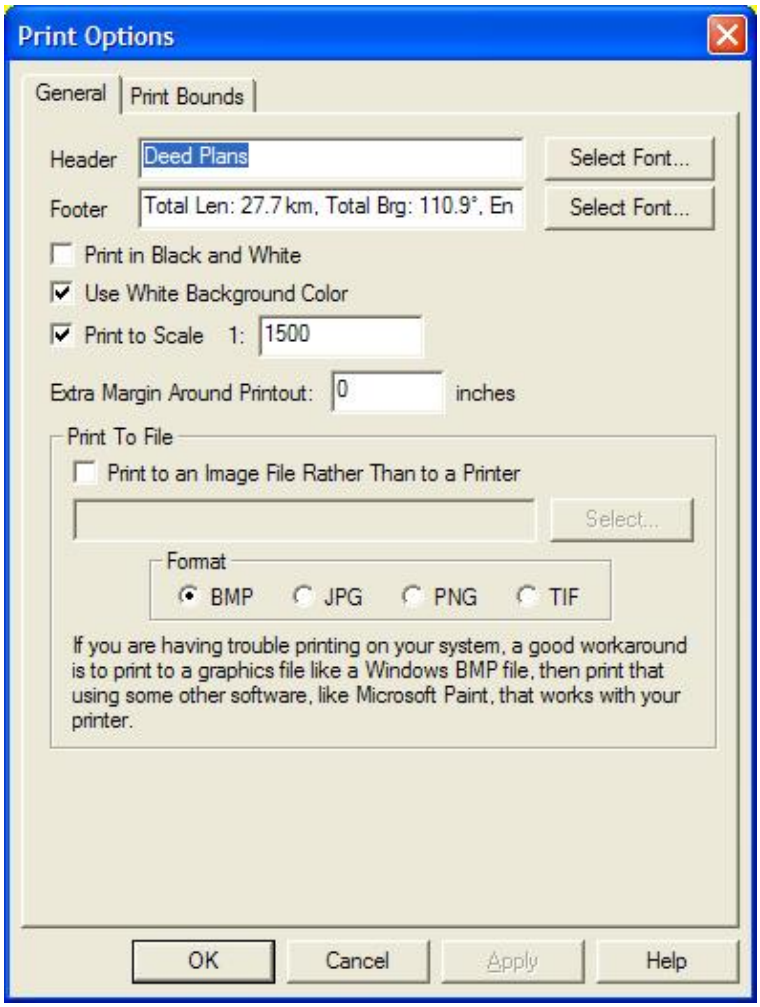
The *Operations at Selected Point Locations* section allows you to perform additional flow and drainage network delineation based on point locations selected in the Digitizer Tool. The *Create Watershed Areas Showing Drainage to Selected Point(s)* option will calculate a drainage (watershed) area for each selected point features showing which portion of the loaded terrain drains to the immediate vicinity (i.e. within one sample of the point location) of the selected point. The *Trace Flow from Selected Point(s) (Water Drop Analysis)* option will cause a separate arrowed line to be generated starting at each selected point feature showing where a drop of water placed at that point location will flow to.

The screenshot below shows a watershed created from a collection of USGS DEMs. In it you can clearly see the stream network as well as the drainage areas for each stream segment.



Print Command

The Print command allows the user to print the contents of the current view window. When selected the *Print* dialog (picture below) is displayed, which allows the user to set up the print process.


Print Options
General
Print Bounds
Header
Deed Plans
Select Font...
Footer
Total Len: 27.7 km, Total Brg: 110.9°, En
Select Font...
Print in Black and White
Use White Background Color
Print to Scale 1: 1500
Extra Margin Around Printout: 0 inches
Print To File
Print to an Image File Rather Than to a Printer
Select...
Format
BMP JPG PNG TIF
If you are having trouble printing on your system, a good workaround is to print to a graphics file like a Windows BMP file, then print that using some other software, like Microsoft Paint, that works with your printer.
OK
Cancel
Apply
Help

The *Header* field allows the user to specify text to be displayed above the printed map image. This text will be printed centered above the map image on the printout.

The *Footer* field allows the user to specify text to be displayed below the printed map image. This text will be printed centered below the map image on the printout. The footer text will default to the text displayed on the status bar for the active tool, such as the measurement information for the current measurement in the Measure Tool.

Selecting the *Print in Black and White* option causes the printout to be generated in black and white, rather than full color even when printing to a color printer. The generated image will be a 256-level grayscale image.

Selecting the *Use White Background Color* option causes any background areas being printed to be filled with white so as not to use any printer ink. Uncheck this option is you want the currently configured background color to be maintained on the printout.

The *Extra Margin Around Printout* setting allows you to specify an extra margin to draw around the output. This is useful when printing to things like a PDF file that do not have any natural margins like a printer does.

The *Print To Scale* option allows you to specify that you want the printed result to match a certain scale, like 1:1000. This means that one inch on the printed paper will correspond to 1000 inches in the real world. If you choose to print to a certain scale, the printout will be centered on the center of your current screen view, but

the appropriate amount of information will be rendered to achieve the requested scale.

The *Print To File* section allows you to specify that the printout be directed to an image file rather than to the printer. This can be handy if you either want to save the results of the printout to email to someone or post on a web site, or you are having trouble printing and would like to print out the data generated by Global Mapper using another application.

The *Print Bounds* panel allows the user to select exactly what area to print (the default is the current screen contents). This panel behaves just like the Export Bounds panel found on most export dialogs.

Print Preview Command

The Print Preview command allows the user to preview what a printout of the contents of the current view window would look like.

Print Setup Command

The Print Setup command allows the user to setup their printer for printing the current view window.

Exit Command

The Exit command closes the Global Mapper application.

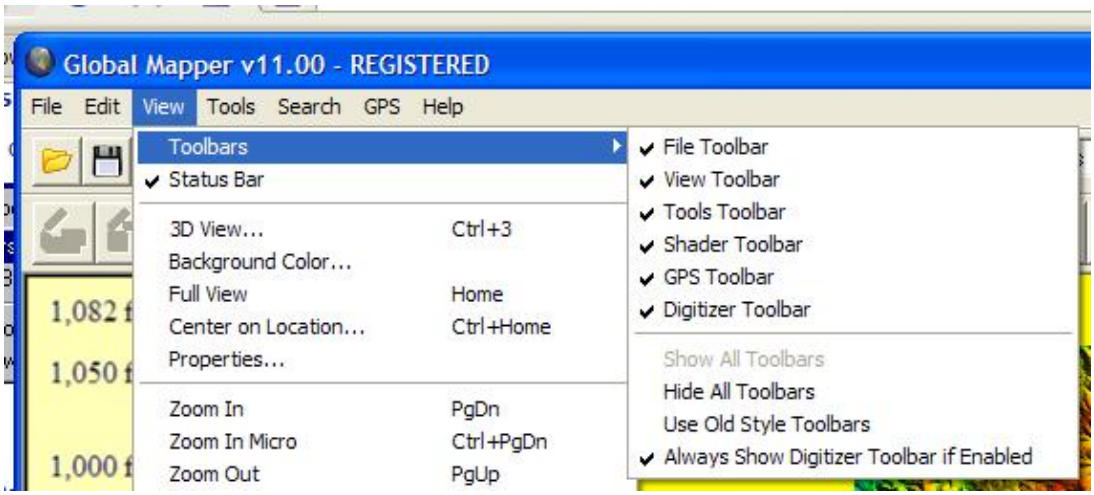
View Menu

The View menu offers the following commands:

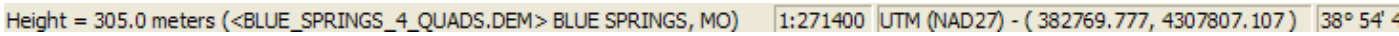
- Toolbars - Shows or hides the toolbar(s)
- Status Bar - Shows or hides the status bar
- Background - Allows user to change the background color
- Center on Location - Allows user to recenter the view on a location
- Properties - Displays Dialog with Properties of Current Map View
- Full View - Zooms such that all loaded data is visible
- Zoom In - Zooms in on loaded data by a factor of 2
- Zoom In Micro - Zooms in on loaded data by a small amount
- Zoom Out - Zooms out on loaded data by a factor of 2
- Zoom Out Micro - Zooms out on loaded data by a small amount
- Zoom To Scale - Zooms the current view to a given scale
- Zoom To Spacing (Pixel Size) - Zooms the current view to a given pixel size
- Save Current View - Saves the current view for later restoration
- Restore Last Saved View - Restores the last saved view
- Restore Last Drawn View - Restores the last drawn view
- Name and Save Current View - Names and saves the current view
- Restore Named View - Restores a previously saved named view

Toolbars

Use this command to display and hide the Toolbars, which includes buttons for some of the most common commands in Global Mapper. A check mark appears next to the menu item when the Toolbar is displayed



Status Bar



The status bar is displayed at the bottom of the Global Mapper window. To display or hide the status bar, use the Status Bar command in the View menu.

The left area of the status bar describes actions of menu items and toolbar icons. The left area of the status bar will also show color or elevation of the current pixel if it's over a raster image, or the description of the closest vector overlay component. If the nearest line feature to the cursor contains recognized addressing information, the address nearest the cursor will be displayed.

The right areas of the status bar indicate the current view scale and the current mouse position in both the global ground reference system and in the Position Display Format currently selected from the Configuration dialog.

Background

The Background command brings up a color dialog box from which the user can select a color to be the new background color of your Global Mapper window. The background color selected will also be used to fill in areas of no data in exported raster imagery (i.e. GeoTIFF and JPG files).

Center on Location

The Center on Location command allows the user to manually enter a location to recenter the view on, providing a quick and easy way to center yourself on a particular location.

Properties Properties

The Properties command displays a dialog listing properties about the current view window.

Full View

The Full View command zooms such that all of the currently loaded overlays fit in the view window. This command also places the overlays in the center of the view window.

Zoom In

The Zoom In command zooms the current view in by a factor of 2.

Zoom In Micro

The Zoom In Micro command zooms the current view in by a small amount.

Zoom Out

The Zoom Out command zooms the current view out by a factor of 2.

Zoom Out Micro

The Zoom Out Micro command zooms the current view out by a small amount.

Zoom To Scale

The Zoom To Scale command zoom the current view to a user-specified scale. For example, to make one inch on the screen be equivalent to 1 mile of ground truth, you would enter a scale of 63360 (this is the number of inches in a mile).

Zoom To Spacing (Pixel Size)

The Zoom To Spacing command zoom the current view so that each pixel on the screen represents a user-specified number of ground units.

Save Current View

The Save Current View command saves the current map view bounds. The saved view can later be restored by using the Restore Last Saved View command. This feature allows you to save a view at one spot, then pan and zoom around and load additional data, then restore your view to the saved spot in one simple operation.

Restore Last Saved View

The Restore Last Saved View command restore the map view to the location last saved using the Save Current View command.

Restore Last Drawn View

The Restore Last Drawn View command restore the map view to the view that was last drawn on the main map. You can use this to back up threw recently drawn view locations and zoom levels.

Name and Save Current View

The Name and Save Current View command associates the current map view bounds with a user-specified name. The saved view can later be restored from a list of named views using the Restore Named View command. This feature allows you to save multiple views with descriptive names, then easily restore those views at a later time.

Restore Named View

The Restore Named View command allows you to restore a previously saved map view. You can save map views for later restoration using the Name and Save Current View command.

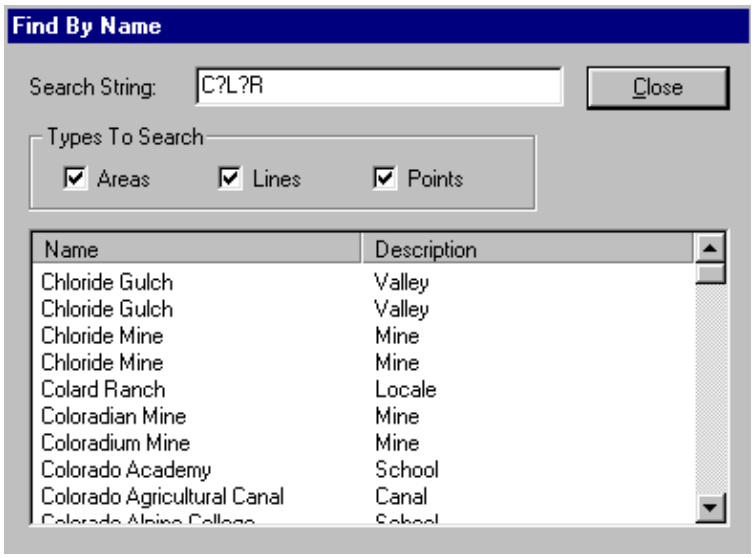
Search Menu

The Search menu currently provides the following commands:

- Search By Name
- Search By Attributes, Name, and Description
- Search and Replace
- Find Address
- Find Features with Duplicate Attribute Values

Search By Name

The Search By Name command allows for searching for features in all loaded vector data by name. When selected, the *Find By Name* dialog is displayed.



The *Find By Name* dialog displays a list of all of the vector features (areas,lines, and/or points) whose label starts with the search string specified in the *Search String* field. This field can contain the ? and * wildcard characters. In addition, one can control which vector object types (area,line, and/or point) to include in the search. Double-clicking on an item in the list will recenter the view on that object and show a bullseye on it (hold down the ALT key when double-clicking to not show the bullseye).

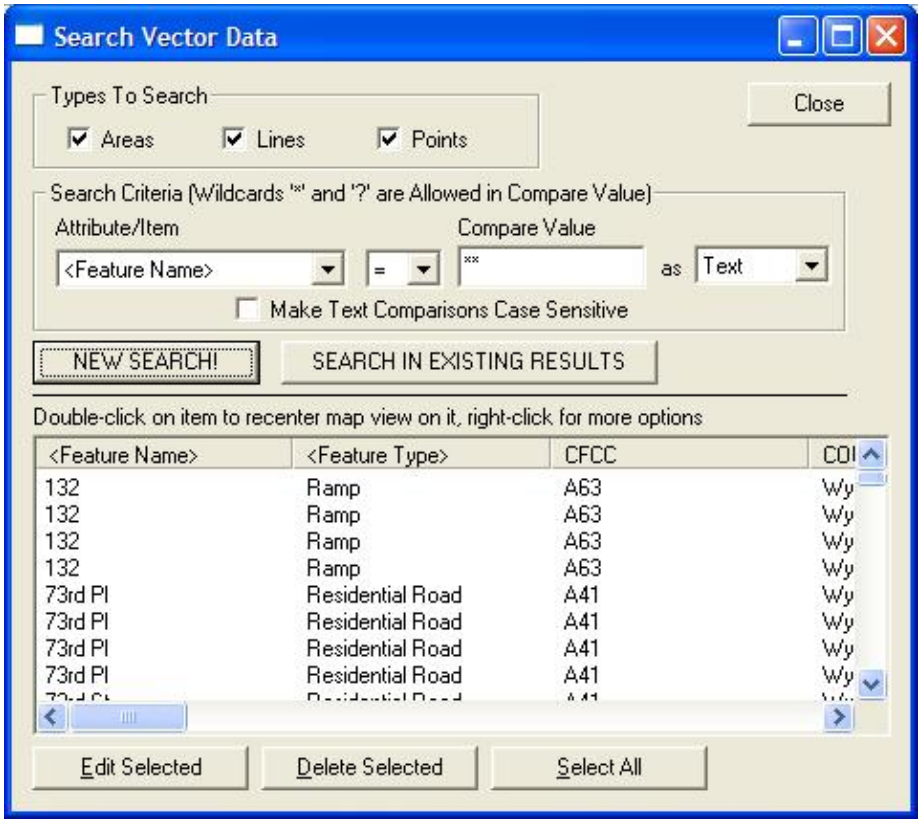
The *Edit Selected* button displays a dialog allowing the user to modify the name, feature type, and drawing style of any features selected.

The *Delete Selected* button will mark all selected features as deleted.

This dialog is particulary handy with the GNIS (Geographic Names) database which is freely available for download.

Search By Attributes, Name, and Description

The Search By Attributes, Name, and Description command allows for searching for features in all loaded vector data by attribute value, name, feature index within the layer, and description/type. When selected, the *Search Vector Data* dialog is displayed.



The *Search Vector Data* dialog displays a list of all of the vector features (areas, lines, and/or points) which match the specified Search Criteria. The Search Criteria can be applied to any attribute value of the loaded features, the display label field, or the description/type field. Comparisons to the Compare Value can be done either textually or numerically. For text equal and not-equal searches, the Compare Value field can contain the ? and * wildcard characters.

In addition, one can control which vector object types (area, line, and/or point) to include in the search.

Once you have your Search Criteria set how you want for the search, press the *New Search* button to actually perform the search and display the matching results in the results list. The results will be sorted in ascending order by the names of the features by default, but you can click on any column header to sort the results by the values in that column. Clicking the same column header again will reverse the order of the sort. You can also press the *Search in Existing Results* button to apply the new search criteria to the existing results. Using this you can create complicated searches based on multiple criteria.

Double-clicking on an item in the list will recenter the view on that object.

The *Edit Selected* button displays a dialog allowing the user to modify the name, feature type, and drawing style of any features selected.

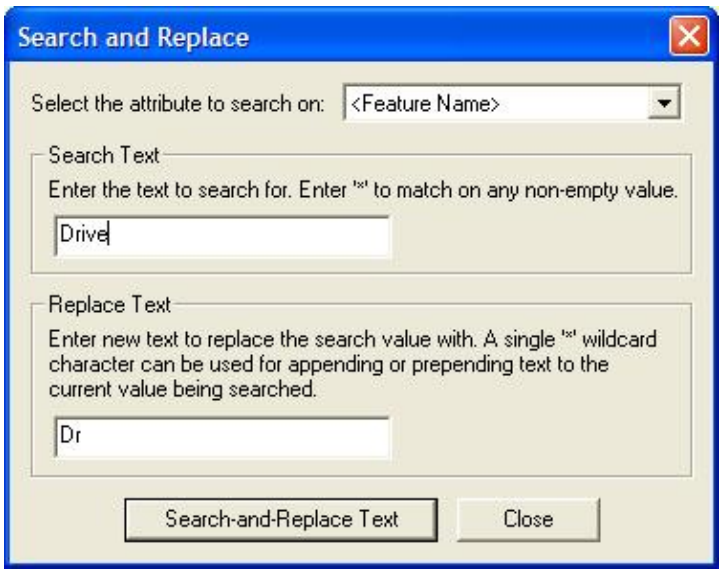
The *Delete Selected* button will mark all selected features as deleted.

If you right click on the results list, additonal options will appear, such as the option to select all of the results in the list. If multiple line features are selected in the results list, when you right click there will be an option to combine those line features into new line features if the selected lines connect at their endpoints. Options for copying the selected features to the clipboard and selecting the selected search results with the Digitizer Tool for further editing will also appear if any results are selected.

ADVANCED USERS: You can change the default search string from '*' to whatever you want by creating a new registry string value with the desired default search string at "HKEY_CURRENT_USER\Software\Global Mapper\DefaultVectorSearchStr".

Search and Replace

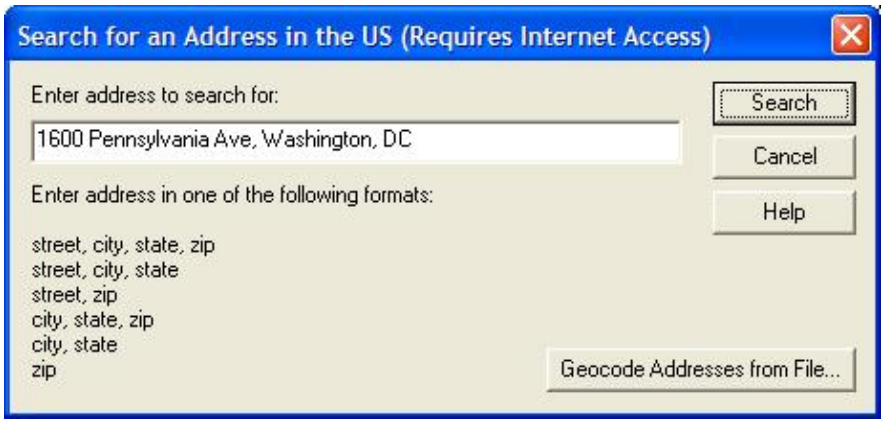
The Search and Replace command allows for searching for a particular text string in the attributes and name of loaded features and replacing that with some other text string. When you select the command, the Search and Replace dialog (pictured below) is displayed, allowing you to setup the search-and-replace operation.


Search and Replace
Select the attribute to search on:
<Feature Name>
Search Text
Enter the text to search for. Enter '*' to match on any non-empty value.
Drive
Replace Text
Enter new text to replace the search value with. A single '*' wildcard character can be used for appending or prepending text to the current value being searched.
Dr
Search-and-Replace Text
Close

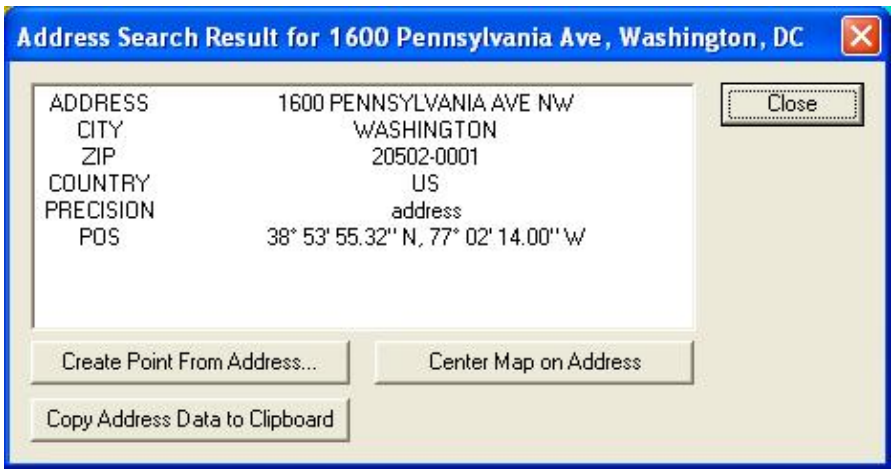
When searching, you can either enter a Search Text value of the string to match on, or you can enter an asterisk (*) to match any non-empty value. In the Replace Text box you have more options. You can specify a simple text string to replace the Search Text with, or you can use a single wildcard to prepend or append text. For example, to prepend the text 'Sample' in front of your search string, enter a replace string of 'Sample*'. To append the text to your search string, use '*Sample'.

Find Address

The Find Address command displays the *Search for an Address in the US* dialog (pictured below) which allows searching for an address, city, or zip code in the United States.



If an address is found that matches the requested location, a results dialog (see sample below) is displayed with the matching location information, as well as button to allow creating a new point feature at the address location, re-centering the map view on the address, and copying the address information to the Windows clipboard for easy pasting into another application.


Address Search Result for 1600 Pennsylvania Ave, Washington, DC
ADDRESS 1600 PENNSYLVANIA AVE NW
CITY WASHINGTON
ZIP 20502-0001
COUNTRY US
PRECISION address
POS 38° 53' 55.32" N, 77° 02' 14.00" W
Close
Create Point From Address...
Center Map on Address
Copy Address Data to Clipboard

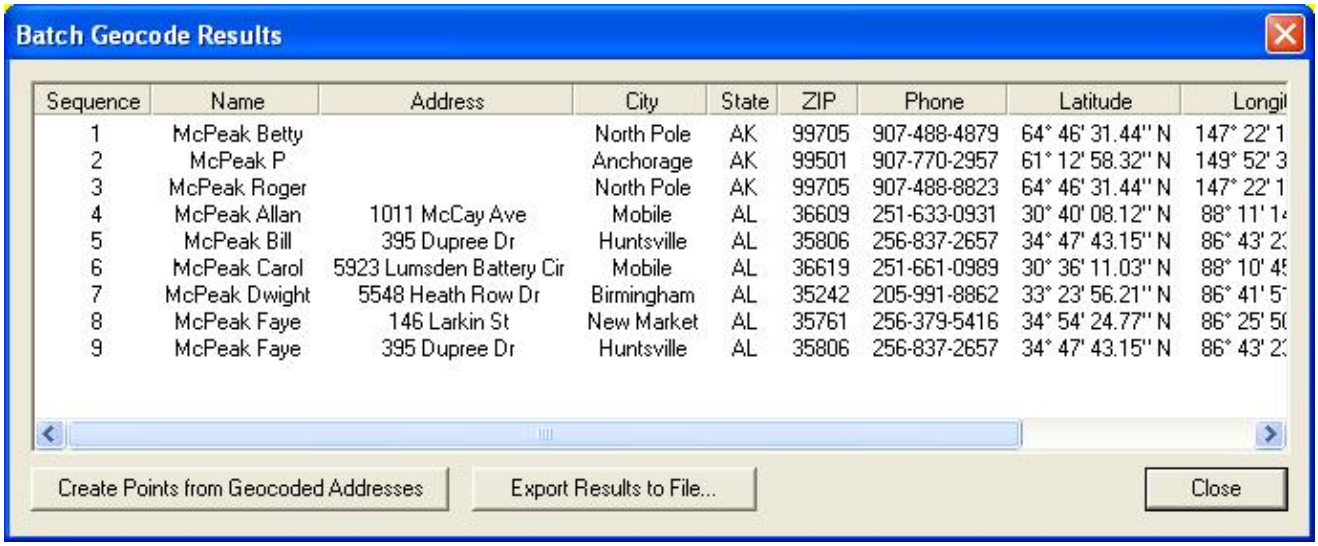
The dialog also includes a *Geocode Addresses from File* button that allows you to geocode a bunch of addresses at once. The text file that you select to convert can either contain a list of files with addresses in the single line form accepted when searching on a single address, or it can be a comma or tab-delimited file with named columns, like Address, City, State, and Zip (see the example file contents below). Note that you are limited to about 5,000 address searches within a single 24 hour period.

```
Sequence,Name,Address,City,State,ZIP,Phone
1,McPeak Betty,,North Pole,AK,99705,907-488-4879
2,McPeak P,,Anchorage,AK,99501,907-770-2957
3,McPeak Roger,,North Pole,AK,99705,907-488-8823
4,McPeak Allan,1011 McCay Ave,Mobile,AL,36609,251-633-0931
5,McPeak Bill,395 Dupree Dr,Huntsville,AL,35806,256-837-2657
6,McPeak Carol,5923 Lumsden Battery Cir,Mobile,AL,36619,251-661-0989
7,McPeak Dwight,5548 Heath Row Dr,Birmingham,AL,35242,205-991-8862
8,McPeak Faye,146 Larkin St,New Market,AL,35761,256-379-5416
9,McPeak Faye,395 Dupree Dr,Huntsville,AL,35806,256-837-2657
```

When batch geo-coding, you can choose to either geocode US addresses against an online database, or to geocode to loaded road data instead. If you choose to geocode against loaded road data, you must already have road data loaded with a known address format, like Tiger/Line data in the US, or data with supported attribute names for addressing information, like R_FROM_ADR, L_TO_ADR, R_FROM_CITY,

L_TO_CITY, etc., so that the data can be geocoded.

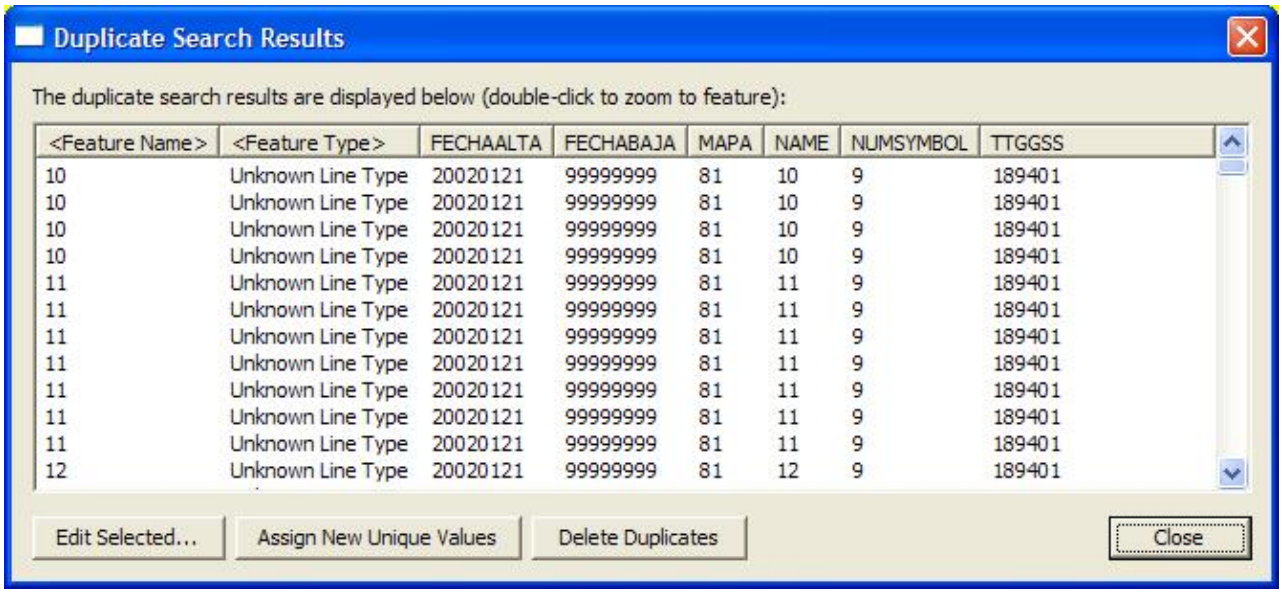
Once you complete a batch geocode operation, the results are displayed in a list in a dialog (see sample below). The Batch Geocode Results dialog contains buttons allowing you to create new point features from the matched address results or to export the results to a new file.


Batch Geocode Results
Sequence
Name
Address
City
State
ZIP
Phone
Latitude
Longi
1 McPeak Betty North Pole AK 99705 907-488-4879 64° 46' 31.44" N 147° 22' 1
2 McPeak P Anchorage AK 99501 907-770-2957 61° 12' 58.32" N 149° 52' 3
3 McPeak Roger North Pole AK 99705 907-488-8823 64° 46' 31.44" N 147° 22' 1
4 McPeak Allan 1011 McCay Ave Mobile AL 36609 251-633-0931 30° 40' 08.12" N 88° 11' 1
5 McPeak Bill 395 Dupree Dr Huntsville AL 35806 256-837-2657 34° 47' 43.15" N 86° 43' 2
6 McPeak Carol 5923 Lumsden Battery Cir Mobile AL 36619 251-661-0989 30° 36' 11.03" N 88° 10' 4
7 McPeak Dwight 5548 Heath Row Dr Birmingham AL 35242 205-991-8862 33° 23' 56.21" N 86° 41' 5
8 McPeak Faye 146 Larkin St New Market AL 35761 256-379-5416 34° 54' 24.77" N 86° 25' 5
9 McPeak Faye 395 Dupree Dr Huntsville AL 35806 256-837-2657 34° 47' 43.15" N 86° 43' 2
Create Points from Geocoded Addresses
Export Results to File...
Close

Find Features with Duplicate Attribute Values

The Find Features with Duplicate Attribute Values command allows you to search loaded vector features to find those that have duplicate values for a selected attribute value. You can then view the results and manually edit them, or choose to automatically assign unique numeric values for the selected attribute so that duplicates no longer exist.

When you select the menu item you are first prompted to select which attribute (including feature name) to search for duplicates on, then the search proceeds and any duplicate values are display in the *Duplicate Search Results* dialog (picture below). This dialog allow you to view the features with duplicate results and to edit those features or automatically assign new unique values. You can also press the *Delete Duplicates* button to mark the duplicate features as deleted. When doing this you will have the option to mark all duplicates (except for the first one) as deleted, or to just delete the duplicate features that also have duplicate coordinates (this is what you'll most often want to do).


Duplicate Search Results
The duplicate search results are displayed below (double-click to zoom to feature):
<Feature Name> <Feature Type> FECHAALTA FECHABAJA MAPA NAME NUMSYMBOL TTGGSS
10 Unknown Line Type 20020121 99999999 81 10 9 189401
10 Unknown Line Type 20020121 99999999 81 10 9 189401
10 Unknown Line Type 20020121 99999999 81 10 9 189401
10 Unknown Line Type 20020121 99999999 81 10 9 189401
11 Unknown Line Type 20020121 99999999 81 11 9 189401
11 Unknown Line Type 20020121 99999999 81 11 9 189401
11 Unknown Line Type 20020121 99999999 81 11 9 189401
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11 Unknown Line Type 20020121 99999999 81 11 9 189401
11 Unknown Line Type 20020121 99999999 81 11 9 189401
11 Unknown Line Type 20020121 99999999 81 11 9 189401
12 Unknown Line Type 20020121 99999999 81 12 9 189401
Edit Selected...
Assign New Unique Values
Delete Duplicates
Close

Help Menu

The Help menu offers the following commands:

- Online Help Command
- FAQ Command
- User's Group Command
- Register Global Mapper Command
- Check for Updates Command
- About Global Mapper Command

Online Help Command

The Online Help... command open the table of contents for the Global Mapper User's Manual in your browser window. You must be connected to the Internet in order to access the online manual.

FAQ Command

The FAQ... command opens the Frequently Asked Questions (FAQ) for Global Mapper in your browser window. You must be connected to the Internet in order to access the FAQ.

User's Group Command

The User's Group command open the Global Mapper Yahoo User's Group in your browser window. You must be connected to the Internet in order to access the user's group.

Register Global Mapper Command

The Register Global Mapper... command displays the *Registration* dialog which allows the user to enter their registration name and code they obtained after purchasing a license for Global Mapper.

Check for Updates Command

The Check for Updates... command checks to see if a newer version of Global Mapper than the current version is being used. If so, a dialog describing the new version is displayed.

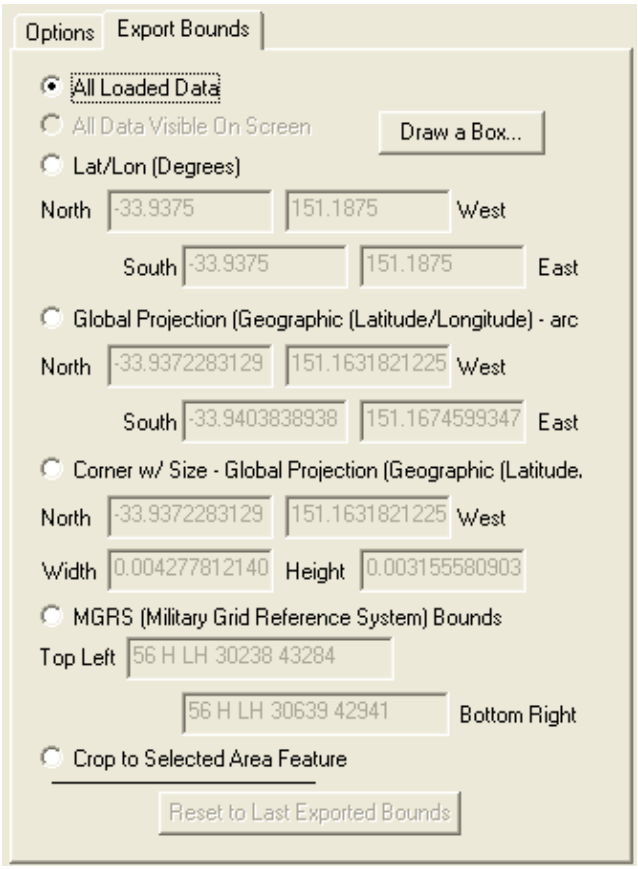
Automatically Check for Updates at Startup Command

The Automatically Check for Updates at Startup... command controls whether or not Global Mapper ever automatically checks for a new version automatically when you start it.

About Global Mapper Command

The About Global Mapper... command displays the *About Global Mapper* dialog which contains version and contact information for Global Mapper.

Export Bounds Panel


Options
Export Bounds
All Loaded Data
All Data Visible On Screen
Draw a Box...
Lat/Lon (Degrees)
North -33.9375 151.1875 West
South -33.9375 151.1875 East
Global Projection (Geographic (Latitude/Longitude) - arc
North -33.9372283129 151.1631821225 West
South -33.9403838938 151.1674599347 East
Corner w/ Size - Global Projection (Geographic (Latitude.
North -33.9372283129 151.1631821225 West
Width 0.004277812140 Height 0.003155580903
MGRS (Military Grid Reference System) Bounds
Top Left 56 H LH 30238 43284
56 H LH 30639 42941 Bottom Right
Crop to Selected Area Feature
Reset to Last Exported Bounds

The *Export Bounds* panel provides several different method for specifying the subset of the currently loaded data that the user wishes to export. Each of these methods is described below. Note that regardless of the method used to specify the bounds, the exported data will be generated in the currently selection global projection.

All Loaded Data

All currently loaded data that is compatible with the current export type will be exported. This is the default selection.

All Data Visible On Screen

All data that is currently visible in the Global Mapper view window will be exported.

Lat/Lon (Degrees)

Allows the user to specify the subset to export as a bounding box in latitude/longitude coordinates. The default values automatically filled in are the lat/lon bounds of all currently loaded compatible data.

Global Projection

Allows the user to specify the subset to export as a bounding box using coordinates in the currently selected global projection system. The default values automatically filled in are the bounds of all loaded compatible

data.

Corner w/ Size - Global Projection

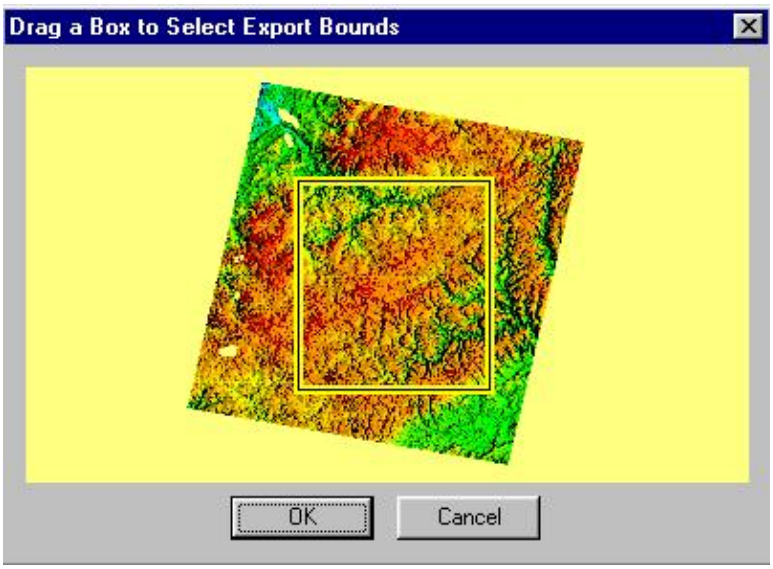
Allows the user to specify the subset to export by entering the northwest corner of the bounding box to export followed by the width and height of the desired area to export. The coordinates entered must be in the currently selected global projection system. The default values automatically filled in result in a bounding box containing all loaded compatible data.

MGRS (Military Grid Reference System) Bounds

Allows the user to specify the subset to export by entering the northwest and southeast corners of the bounding box to export in MGRS coordinates. The default values automatically filled in result in a bounding box containing all loaded compatible data.

Crop to Selected Area Feature

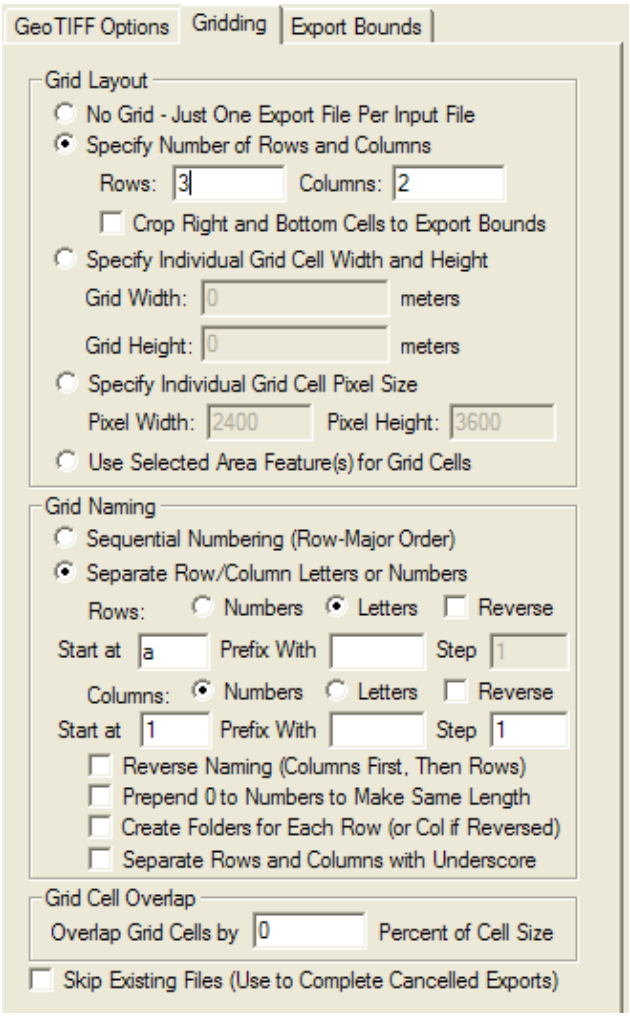
If enabled, allows the user to crop the export to the currently selected area feature(s). To use this for supported exports, select the area(s) that you wish to crop the export to using either the Feature Info Tool or the Digitizer Tool.

Draw Box 

Pressing the *Draw Box...* button brings up the *Drag a Box to Select Export Bounds* dialog. In this dialog, simply hold down the left mouse button and drag a rectangle around the area of the image that you wish to export. If you make a mistake, just drag another rectangle.

When you press the *OK* button, the bounds of the rectangle that you drew will automatically be inserted into the appropriate controls in the *Export Bounds* panel.

Gridding Panel


GeoTIFF Options
Gridding
Export Bounds
Grid Layout
No Grid - Just One Export File Per Input File
Specify Number of Rows and Columns
Rows: 3
Columns: 2
Crop Right and Bottom Cells to Export Bounds
Specify Individual Grid Cell Width and Height
Grid Width: 0
meters
Grid Height: 0
meters
Specify Individual Grid Cell Pixel Size
Pixel Width: 2400
Pixel Height: 3600
Use Selected Area Feature(s) for Grid Cells
Grid Naming
Sequential Numbering (Row-Major Order)
Separate Row/Column Letters or Numbers
Rows: Numbers Letters Reverse
Start at a
Prefix With
Step 1
Columns: Numbers Letters Reverse
Start at 1
Prefix With
Step 1
Reverse Naming (Columns First, Then Rows)
Prepend 0 to Numbers to Make Same Length
Create Folders for Each Row (or Col if Reversed)
Separate Rows and Columns with Underscore
Grid Cell Overlap
Overlap Grid Cells by 0
Percent of Cell Size
Skip Existing Files (Use to Complete Cancelled Exports)

The *Gridding* panel provides the user with the means to easily split up data on export into a regularly spaced grid if desired, using one of the following options:

- No Grid - This option means that no gridding will be done, only a single file with be exported with the full specified export bounds. This is the default option.
- Specify Number of Rows and Columns - Specifies that the data should be broken up into the given number of rows and columns of tiles. Every tile will have the same width and height unless you check the *Crop Right and Bottom Cells to Export Bounds* option, in which case the exported tiles along the right and bottom may be slightly smaller than the other so that no data from outside the specified export bounds is used.
- Specify Individual Grid Cell Width and Height - Allows the user to specify the desired width and height in ground units that they wish each grid cell tile to be. Every tile will have that width and height, which means that the right-most column and bottom-most row of tiles could go beyond the specified export bounds. If you specify negative cell width and/or height values, the grid cells will be snapped to the right and/or bottom edge(s) of the export bounds rather than the top left.
- Specify Individual Grid Cell Pixel Size - Allows the user to specify the desired width and height in pixels that they wish each grid cell tile to be. Every tile will have that width and height in pixels, which means that the right-most column and bottom-most row of tiles could go beyond the specified export bounds. This option is not available for vector-based exports since it does not make sense for

those export types.

- Use Selected Area Feature(s) for Grid Cells - This option will export a file for each area feature selected with the Feature Info or Digitizer Tools. When you select this feature, you will be prompted to select how to name the files based on each area. You can choose from using the display label of the area, the filename of the file that the area was loaded from, an attribute value of the area, or just a simple sequential numbering scheme. You will also be prompted to choose whether each export should actually be cropped to the polygonal boundary of the area or should just use the rectangular bounds of the area's boundary. Note that when you select a filename to save to after this, the filename portion of the selected name will be pre-pended to whatever is used as the grid cell name. So if you want just your selected item (i.e. attribute, name, etc.) and nothing prepended, only specify a period and then the extension when selecting the base output filename, like '.jpg' for JPG output.

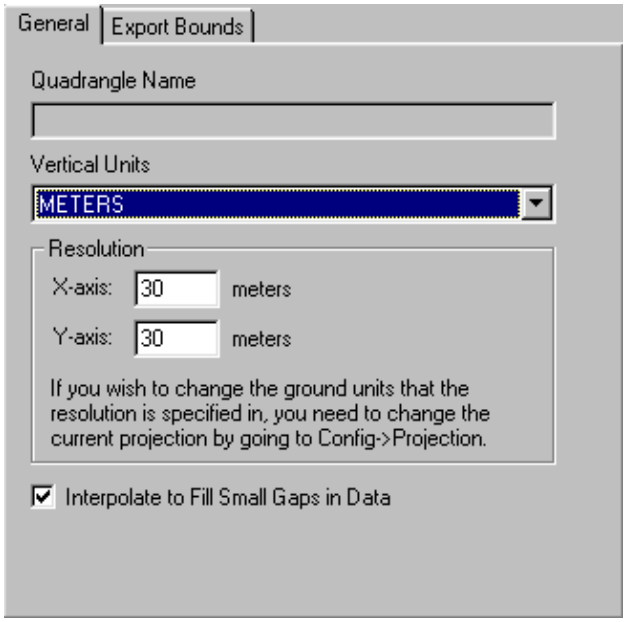
If the user chooses to breakup the data into a grid, then the options in the *Grid Naming* section will apply and allow the user to control how the individual grid tile files are named. The following naming options are available:

- Sequential Numbering (Row-Major Order) - With this option, a number starting at 1 for the top-left tile will be appended to the selected export filename. The number will increase across each row.
- Separate Row/Column Letters or Numbers - With this option, separate indicators will be appended to the selected export filename for the row and column. If letters are selected, the letters A-Z will be used. If more than 27 letters are needed, multiple letters will be used (e.g. AA, AB, etc.). If numbers are used, the number values will be pre-pended with zeroes in order to make the numeric values have the same number of characters for every output tile. If the *Reverse* checkbox is marked, the order or the numbers or letters used will be reversed (e.g. if there are 4 rows and numeric naming is selected, the rows will be named 4, 3, 2, 1 instead of 1, 2, 3, 4). The user also has the option of specifying the letter/number to start naming at as well as the option to specify a prefix for each column and row number for each tile and the option to specify by what value numeric names should change by (step) for each successive row or column. If the *Reverse Naming* option is checked, the column name will come before the row name in the export filename, otherwise the row name will be before the column name. If the *Prepend 0 to Numbers to Make Same Length* option is checked, the longest number will be found for both the column and row names and all other column/row names will have 0's prepended to make them all the same length. If the *Create Folders for Each Row (or Col if Reversed)* option is checked, a separate output sub-folder will be created for each row (or column) that is exported, preventing too many files from being placed in a single folder. The *Separate Rows and Columns with Underscore* option causes an underscore to be used to separate row and column values in the output filenames. If not checked then no separator character will be used.

The *Grid Cell Overlap* section allows the user to specify that the generated grid cells should overlap each other by a certain percentage of the cell size. This option is useful for loading the slightly overlapping result files into something like Photoshop for color matching between cells.

If the *Skip Existing Files* option is checked, any grid cell file that already exists at the destination location will be skipped. This makes it easy to resume a cancelled export as the already exported files would not be re-exported.

Elevation Export - General Options Panel



The *General* panel allows the user to specify the quadrangle name (DEMs only), vertical units, and grid spacing of an elevation grid being exported.

The *Quadrangle Name* field allows the user to enter the quad name to place in the header of a native format USGS DEM being exported.

The *Vertical Units* field allows the user to select the vertical units to use when exporting the data (i.e. meters or feet). Any input data not in the selected vertical units will be automatically converted on export.

The *Resolution* section allows the user to selected the grid spacing to use when generating the elevation data set. The default value is the average of the grid spacings of all the currently loaded elevation overlays.

When selected, the *Interpolate to Fill Small Gaps* option specifies that small gaps in between and within the data sets being exported will be filled in by interpolating the surrounding data to come up with an elevation for the point in question. This is useful when data sets do not line up exactly and so have small gaps in between them.

Image Rectification (Georeferencing)

The Image Rectification feature in *Global Mapper* allows you to load and work with any JPG, PNG, or TIFF imagery, regardless of whether or not spatial positioning information is provided with it.

For example, you could scan in an image of a map to a JPG file, use the File->Rectify Imagery menu command to enter the coordinates of several points on that image, and then load it into *Global Mapper*, properly overlaid with any other loaded data.

Click Here for a Video Tutorial provided by www.globalmapperforum.com

Once you have rectified an image in *Global Mapper*, you can then export it to any of the supported export formats to obtain a fully rectified image that can then be immediately loaded into numerous other imaging and GIS packages.

If you find that after rectifying a file that you want to modify the rectification, you can simply select the layer in the Overlay Control Center, then right-click and select the Modify Layer Position/Projection option to bring up the rectification dialog for that layer.

As-Needed Rectification

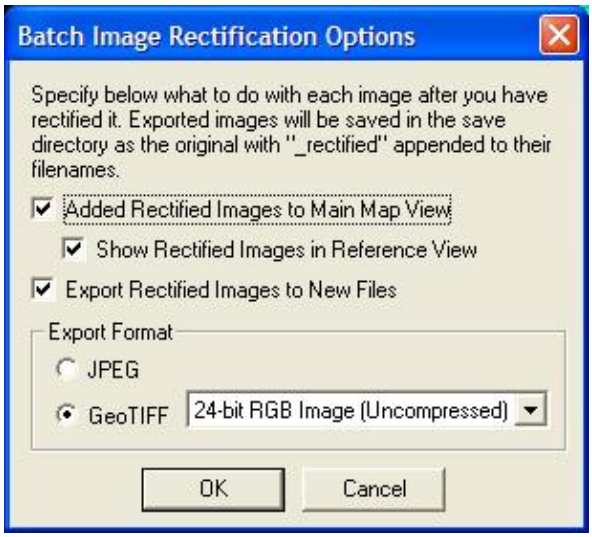
There are two ways to rectify imagery in *Global Mapper*. The first is to simply load the imagery file needing to be rectified just like any other file. *Global Mapper* will automatically prompt you to rectify an image if it cannot automatically determine where on the earth the image should be placed.

If you indicate that you would like to rectify an image when prompted, the Image Rectifier dialog will appear, allowing you to enter ground control points for the image in order to rectify it. This process is described in detail later.

Batch Rectification

By using the Rectify (Georeference) Imagery command under the File menu, you can select multiple images to rectify at a time. You will be allowed to rectify all images that you select, regardless of whether they already contain valid positioning information. In this way, you can correct poorly positioned imagery.

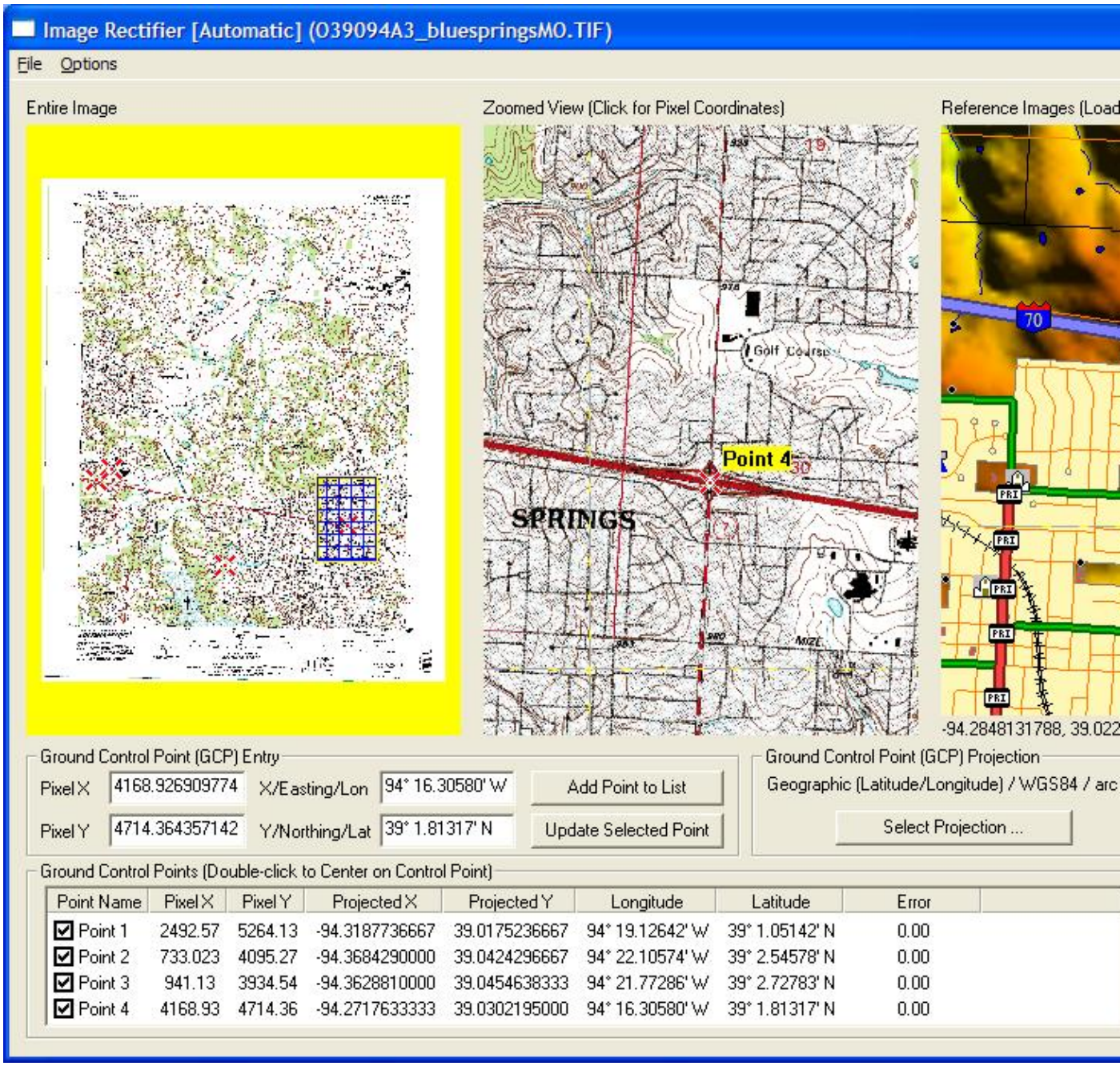
Using the Batch Image Rectification Options dialog (pictured below), you can setup whether you would like to view the images after rectification, export them to one of several formats, or both.


Batch Image Rectification Options
Specify below what to do with each image after you have rectified it. Exported images will be saved in the save directory as the original with "_rectified" appended to their filenames.
Added Rectified Images to Main Map View
Show Rectified Images in Reference View
Export Rectified Images to New Files
Export Format
JPEG
GeoTIFF
24-bit RGB Image (Uncompressed)
OK
Cancel

Regardless of which options you select, you will then be allowed to rectify each image in turn using the Image Rectifier dialog, while is described in detail later. As you rectify each image, it will get added to the Reference Images view in the Image Rectifier dialog, allowing you to select ground coordinates from it for subsequent images. This allows you to ensure a good fit between adjacent data files.

If you selected to save the image(s) to JPG or GeoTIFF image(s), the new files will be written after you have rectified ALL of the selected files. This is extremely useful as you can setup the rectification parameters for numerous images, then let the sometimes lengthy rectification and saving process happen while you do something else. All newly rectified files will be created in the same directory as the original images, with _rectified appended just before the file extension. The original imagery will remain intact and unchanged.

Image Rectifier Dialog



The Image Rectifier dialog is the heart of the image rectification process. This dialog contains everything that you need to rectify an image, from graphical views of the image, to lists of ground control points, to an Options menu for selecting the rectification and resampling methods to use. Each part of this dialog is covered in detail below.

File Menu

The File menu provides options allowing you to save the current ground control point list to a file and to add additional ground control points from a file. The file specifying the ground control points should be a comma-delimited file in the following format:

&ltx-pixel location&gt,&lty-pixel location&gt,&ltx-ground location&gt,&lty-ground location&gt,&ltpoint name (optional)&gt,&ltpoint error in pixels (optional)&gt

There are also options on the File menu for loading control points and projection information from an OziExplorer .map, CompeGPS .imp, and Touratech TTQV .cal files as well as saving your control point information to world (TFW, JGW, etc.) files.

Options Menu

The Options menu allows you to setup various options related to the rectification process, as described below:

- *Rectification Method* - the Rectification Method submenu allows you to select which rectification method (hence the name) to apply to the entered control points. Different methods are available based on how many control points have been entered. The various methods are as follows:
  - *Automatic* - the Automatic select automatically selects the "best" rectification method that is available based on the number of control points that have been entered. This is the default method and should rarely need to be changed.
  - *Linear* - the Linear rectification method is used when only two control points are entered. This is the simplest of the rectification methods and is equivalent to supplying a world file for the image. This method does not allow for any distortion or rotation in the image, but often works well if the correct projection is selected for the image.
  - *Helmert* - the Helmert, or similarity, rectification method requires at least two controls points to be entered. This rectification method is useful if you need to maintain the original shape of data after a transformation. This method will only be used if you explicitly select it from the list of rectification methods.
  - *Affine* - the Affine rectification method requires at least three controls points to be entered. This rectification method calculates a best fit to a simple equation of the control points entered. This method can account for some degree of rotation and distortion, but not with a high degree of accuracy. Because a best fit approximation is used, some of your ground points may move a little in order to minimize the error among all control points.
  - *Polynomial* - the Polynomial rectification method requires at least four control points to be entered. This rectification method calculates a best fit to a more complex polynomial equation described the transformation from pixel space to ground coordinate space. Because a best fit approximation is used, some of your ground points may move a little in order to minimize the error among all control points. If you have 6 or more control points, a second order (N=2) polynomial will be used to transform the points.
  - *Triangulation* - the Triangulation rectification method requires at least five control points to be entered. This rectification method performs a Delaunay triangulation for the control points and will exactly preserve the location of each entered control point. Occasionally the Triangulation method generates some odd results around the edges of the rectified image. If this happens, try to enter more control points around the edge of the image, or change your rectification method to Polynomial.
- *Resampling Method* - the Resampling Method submenu allows you to select how the source image pixels will be resampled to create the rectified imagery. These setting simply control whether or not the Anti-Alias Pixels setting is turned on or off for rectified images. This can be changed later in the Overlay Control Center.
  - *Nearest Neighbor* - simply pick the closest pixel from the source image for each pixel in the rectified image. This can result in some blockiness. This is equivalent to having the Anti-Alias Pixels setting OFF.
  - *Bilinear Interpolation* - performs a weighted average of the four closest pixels in the source image to determine the color for a pixel in the rectified image. This is equivalent to having the

Anti-Alias Pixels setting ON.

- *Auto-Name GCPs* - this setting controls whether or not you will be prompted to enter a name for each ground control point (GCP) entered. Disabling this allows you to specify a name for each GCP, but can interrupt workflow. Unless you have a specific need to name your GCPs, we would recommend turning this option on.
- *Display GCP Labels* - this setting controls whether or not the names of each ground control point (GCP) will be displayed in the Zoomed and Reference Image views.
- *Remember Last Projection* - this setting controls whether or not to initialize the projection to the last used rectification projection when rectifying new data. If this is not enabled, the projection will always default to Geographic/Arc Degrees/WGS84.
- *Add Control Points at Corner Points* - this option allows you to easily create a control point at each corner of the layer being rectified. If enough other control points have already been entered to do a rectification, the new corner control points will automatically be initialized with the best guess at the ground/projected location, otherwise they will be initialized with dummy values.
- *Display Transformation Equations* - this option displays the actual transformation equations used for transforming this image based on the selected rectification method and the entered control points. Note that this is only available if enough control points have been entered for a transformation to be calculated and if the transformation method is based on a simple set of equations.
- *Show Crosshairs Across Entire Map* - this option controls whether or not crosshair lines are displayed across the entire Zoomed View and Reference Image views.
- *Automatically Save GCP File When Done* - this option will automatically prompt the user to save a GCP file when they select the OK or Apply button to complete a rectification operation.
- *Ctrl+Left Click Recenters and Zooms Other View* - this option controls whether or not Ctrl+Left Clicking in the Zoomed or Reference Image view just recenters the other view if possible, or if it also zooms the other view to the same approximate extents.

Entire Image View

The Entire Image View portion of the Image Rectifier dialog displays, as you might expect, a view of the entire image being rectified. Any ground control points (GCPs) will also be depicted on this view with a "big red X". The current portion of the image being displayed in the Zoomed View section will be highlighted as well.

You can use the mouse in the Entire Image View to control what portion of the image is visible in the Zoomed View. Clicking the left mouse button anywhere in the Entire Image View will cause the Zoomed View to be recented on the click position. Dragging a rectangle with the left mouse button will cause the Zoomed View to recenter and zoom to the box. If you also hold down the CTRL key when clicking the left mouse button, the Reference Image view will also be recentered on the associated point if there have been enough control points entered to convert the coordinates.

Zoomed View

The Zoomed View portion of the Image Rectifier dialog allows the user to pan and zoom around the image as well as select pixel coordinates for control point entry. Any ground control points (GCPs) will be depicted in this view as well with a "big red X".

You can drag a box with the left mouse button to zoom in on a particular area in this view. Right clicking will zoom out. If you hold down the CTRL key when right-clicking will zoom out to the full extents. For those of you with wheel-mice, rolling the wheel forward zooms in and rolling it back zooms out. Moving the mouse near the edge of the Zoomed View displays a pan arrow. Clicking when this is visible will cause the view to pan in the direction of the arrow (hold down CTRL to increase the size of the pan). Pressing down the Shift

button while moving the mouse will disable this functionality and allow you to click all the way to the edge of the Zoomed View.

To select a location for control point entry, position the crosshair over the pixel of interest, then press and release the left mouse button. This will cause the pixel coordinates of the point to be entered in the Ground Control Point (GCP) Entry portion of the dialog (described below). In addition, a small red dot will be placed at the click location to make it easy to see. If you also hold down the CTRL key when clicking the left mouse button, the Reference Image view will be recentered on the associated point and the reference coordinates wil automatically be filled in if there have been enough control points entered to convert the coordinates. If you hold down the SHIFT key when left-clicking, the current control point will automatically be added to the GCP list, just as if you had pressed the Add GCP to List button.

Reference Images

The Reference Images portion of the Image Rectifier dialog allows the user to view what is currently loaded in the main *Global Mapper* view and to enter ground coordinates by left-clicking on an appropriate place on the view. This can be very useful for doing things such as rectifying a satellite photo by clicking on the Zoomed View at a road intersection to select the pixel coordinates, then clicking on the intersection of those roads on a vector file loaded into the main view. By default when you click near a vector feature in the Zoomed View, the location will snap to that vector feature. You can disable this behavior by holding down the ALT key when clicking. If you hold down the SHIFT key when clicking, the clicked coordinates will be rounded to the nearest 30 seconds for arc degree units and the nearest 1000 ground units for other coordinate units. Holding down the CTRL key when clicking the left mouse button will cause the Zoomed Image view will be recentered on the associated point and also fill in the pixel X and Y coordinatess automatically if there have been enough control points entered to convert the coordinates.

You can also zoom and pan the Reference Images view in a manner identical to the Zoomed Images view.

Ground Control Point (GCP) Entry

This portion of the dialog is where you actually enter the ground control points (GCPs) that define where the image is on the earth. Typically, you will click a position in the zoomed view to fill in the pixel coordinates, then manually enter the ground coordinates into the *X/Easting/Lon* and *Y/Northing/Lat* data fields or else select a point from the Reference Image view for the ground coordinates.

IMPORTANT: If you manually enter the ground coordinates, you must enter them in the coordinate system indicated by the Ground Control Point Projection portion of the dialog, otherwise you will get incorrect results. The one exception is that if you enter a value that looks like a lat/lon coordinates but a projected system is selected, you will be prompted to select whether or not the entered coordinates are lat/lon coordinates or coordinates in the selected projection system.

Once the coordinates are entered, press the Add GCP to List button to add the GCP to the list of GCPs to be used when rectifying the image. The Update Selected GCP button allows you to update the coordinates associated with a previously entered GCP. You can also use Alt+R to simulate pressing the Update Selected GCP button.

Ground Control Point (GCP) Projection

This portion of the dialog allows you to select the projection that ground coordinates are entered in as well as what projection the image will be natively treated as when rectified (it can be reprojected later using the normal *Global Mapper* reprojection mechanisms). See the IMPORTANT note above for more details.

When rectifying new imagery, you can control the default projection used by creating a default_rectification.prj file in your Global Mapper installation folder. If present, the default rectification projection selected when you open the rectification dialog will be whatever projection is specified in that PRJ file.

Ground Control Points List

This section of the dialog contains a list of all of the entered GCPs, including their name, pixel coordinates, ground coordinates, and the estimated error (in pixels) at each GCP based on the current rectification method.

Each GCP has a checkbox next to indicating whether or not that GCP is used for the rectification. This provided you an easy way to remove GCPs from a rectification to see how they affect it.

Double-clicking an item in this list will cause the Zoomed View to recenter on the GCP and will fill in the Ground Control Point Entry section with the pixel and ground coordinates of the selected GCP, allowing for easy updating of GCP locations.

You can move the selection in the GCP list up and down using the Alt+Q and Alt+Z hot keys. These can help facilitate quickly entering lots of GCPs without having to use the mouse.

If you simply want to shift an image, all that you need to do is press the Shift All button and specify the adjustment to apply to each entered GCP.

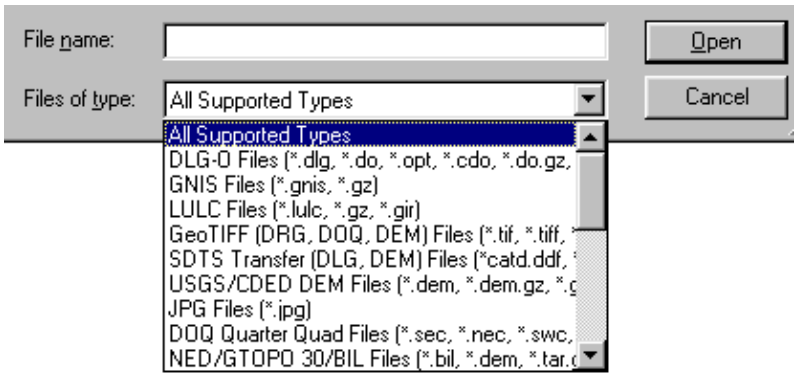
Completing the Rectification Process

Once you have entered all of your ground control points (GCPs), press the OK button to complete the image rectification. Depending on how you entered the dialog, the rectified image will now be in the view, will be saved to a new rectified file, or you will start the rectification of the next selected image.

If you are repositioning a loaded file, you can press the Apply button to re-rectify the file with the updated GCPs and see the results of your modifications.

4 LOADING FILES

Choose [Open as New] icon from the Toolbar. An open window will appear. This window can be set to display only files of selected types with the "Files of Type:" subwindow.


File name:
Open
Files of type:
All Supported Types
Cancel
All Supported Types
DLG-O Files (*.dlg, *.do, *.opt, *.cdo, *.do.gz,
GNIS Files (*.gnis, *.gz)
LULC Files (*.lulc, *.gz, *.gir)
GeoTIFF (DRG, DOQ, DEM) Files (*.tif, *.tiff,
SDTS Transfer (DLG, DEM) Files (*catd.ddf,
USGS/CDED DEM Files (*.dem, *.dem.gz, *.
JPG Files (*.jpg)
DOQ Quarter Quad Files (*.sec, *.nec, *.swc,
NED/GTOPO 30/BIL Files (*.bil, *.dem, *.tar.

There is support for opening USGS DLG-O, DEM, and several other file types directly from gzipped archives. In addition, SDTS DLG, SDTS DEM, and most other file types can be opened directly from .tar.gz, .tgz, and .zip archive files. This means that you no longer need to extract all of those SDTS files to their own directory before opening them. Global Mapper will do that automatically.

Loading Multiple Files

Global Mapper will display multiple data sets in correct geospatial positions; that is, adjacent data sets can be mosaicked, and vector data can be displayed on top of raster and elevation data.

Choose [Open Data Files] icon from the Toolbar and select files. The registered version Global Mapper has no limit on the number of overlays that can be viewed simultaneously. A maximum of four files of any type may be viewed simultaneously in the unregistered version of Global Mapper.

You can also load all of the files under a directory and all subdirectories under that directory that match a specified filename mask. You can do this using the [Open All Files in a Directory Tree] File menu command.

Projections and Datums

The Global Mapper display space adopts the coordinate system of the first data set opened. Subsequent data sets will be transformed to the coordinate system of the first data set loaded or the display projection subsequently selected from the configuration dialog.

This is a very powerful feature; it makes differences in projections and datums transparent to the user. This also means that the order in which data sets are loaded can have a significant impact on the appearance of the display. This is the most obvious when working with data sets of widely varying scales.

5 CHANGE DISPLAY CHARACTERISTICS

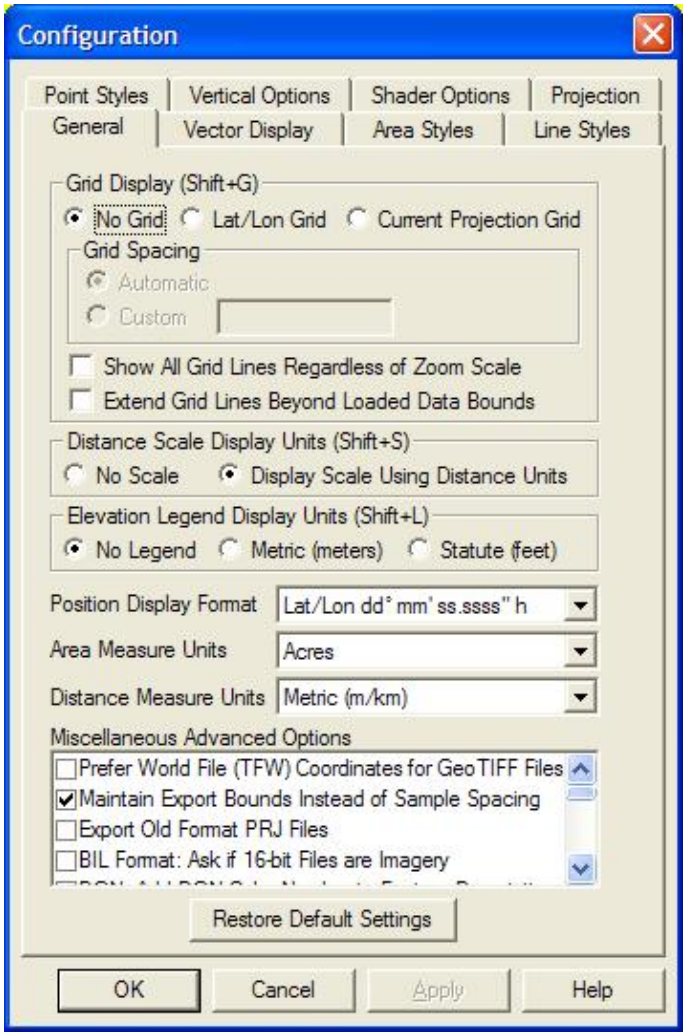
Selecting the [Tools/Configuration] menu item or toolbar button displays the *Configuration* dialog. This dialog provides for general setup of Global Mapper display options.

The *Configuration* dialog provides the following panels allowing the modification of display options:

- General - Scale, Units, and Position Display Setup
- Vector Display - Vector Display Setup
- Area Styles - Area Type Color/Fill/Border Settings
- Line Styles - Line Type Color/Width/Style Settings
- Point Styles - Point Type Symbol Settings / Custom Symbols
- Vertical - Elevation Display Setup
- Shader - Shader-Specific Setup
- Projection - Select Display Projection/Datum

General Options

The *General* panel (pictured below) controls options for the display of vector data (areas, lines, and points) as well as position format on the status bar.



The *Grid Display* options allow for the control of whether or not grid lines are displayed, and if so, what projection they will be in. The *No Grid* option is the default and causes no grid lines to be displayed or exported. The *Lat/Lon Grid* options causes a grid to be displayed along even latitude and longitude lines. The *Global Projection Grid* option causes a grid to be displayed in the currently selected global (i.e. display) projection, which can be modified on the *Projection* tab.

The *Grid Spacing* section allows you to specify whether to allow Global Mapper to automatically determine a good grid spacing to use or to specify a custom grid spacing.

If the *Show All Grid Lines Regardless of Zoom Scale* option is checked, all grid lines will always be shown rather than the default behavior of only major grid lines being displayed when zoomed way out and the more minor grid lines only showing up as you zoom in.

If the *Extend Grid Lines Beyond Loaded Data Bounds* option is checked, the generated grid lines will extend a little bit beyond the bounds of the loaded data. Otherwise, the grid lines will stop at the edge of the smallest bounding box encompassing all loaded data files.

If grid lines are being displayed, the grid lines can also be exported to any of the supported vector export formats. The color and style of the grid lines can be modified on the *Line Styles* tab by modifying the styles for the "Grid Line", "Grid Line - Minor", and "Grid Line - Major" line types. You can also selectively turn off the display of any or all of the grid line types using the *Filter* options described above.

The *Distance Scale Display* options allow for the control of whether or not a distance scale is displayed on the main map when data is loaded. The *Distance Measure Units* selection below it then controls the units that are displayed on the scale bar.

The *Elevation Legend Display Units* options allow for the control of whether or not an elevation legend is displayed on the main map when elevation grid data is loaded and what units the elevation legend will be in if it is displayed. The *No Legend* option causes no elevation legend to be displayed. The *Metric (meters)* option causes an elevation legend to be displayed with various elevation values labeled in meters. The *Statute (feet)* option causes an elevation legend to be displayed with various elevation values labeled in feet. If the elevation legend is displayed in the main map view, you can right click on it to control various options and also save it to a BMP file.

The *Position Display Format* setting controls the format of the cursor latitude/longitude position display in the status bar.

The *Area Measure Units* setting controls what units that area measurements will be displayed in the Measure Tool and when creating new features with the Digitizer Tool.

The *Distance Measure Units* setting controls what units that distance measurements will be displayed in the Measure Tool and when creating new features with the Digitizer Tool as well on on the Distance Scale bar.

The *Miscellaneous Advanced Options* section contains options for advanced users. The following options are available:

- **Prefer World File (TFW) Coordinate for GeoTIFF Files** - if checked, this option specifies that for GeoTIFF files that also have accompanying TFW files, the coordinates from the TFW file will be used rather than the coordinates embedded in the GeoTIFF file.
- **Maintain Export Bounds Instead of Sample Spacing** - if checked, this option specifies that when exporting a raster/elevation format and the bounding box for the export is not an exact multiple of the

specified sample spacing for the export, the sample spacing will be adjusted to be slightly smaller rather than the default of adjusting the export bounds up to the next sample spacing boundary.

- **Use Current Screen Bounds by Default when Exporting** - if checked, this option specifies that the default choice on the Export Bounds tab when exporting should be to use the current screen bounds rather than exporting all loaded data.
- **Default Contrast Adjustment to Linear Min/Max Stretch** - if checked, this option specified that layers that come in with automatic contrast adjustment enabled by default (primarily imagery with more than 8 bits per color channel) will defualt to using the linear min/max strecth contrast adjustment mode rather than the standard deviation adjustment.
- **Never Automatically Contrast Adjust Images on Load** - if checked, this option disables the automatic contrast adjustment of imagery with more than 8 bits per color channel on import.
- **Terrain Export: Specify Bounds as Pixel is Area** - if checked, this option specifies the the bounding box that you provide when exporting to new terrain/ gridded elevation formats will be specifed as "pixel is area" (i.e. via coordinates of the edges of the grid cells) rather than the default of "pixel is point" (i.e. coordinates refer to center of outer grid cells rather than outer edges of cells).
- **BIL Format: Ask if 16-bit Files are Imagery** - if checked, this option will cause the user to be prompted to choose whether 16-bit BIL files that are encountered are elevation or imagery files. If not checked, any 16-bit BIL files will be assumed to be elevation files.
- **DGN: Import Cells as Point Features** - if checked, this option causes cell features in DGN v8 and later files that have an associated point location to just be loaded as a single point feature rather than the collection of features specified by the cell.
- **DGN: Add DGN Color Number to Feature Description** - if checked, this option causes the DGN color number for each feature to be appended to the feature description/level number.
- **DXF/DWG: Import INSERT entities as point features** - if checked, this option specifies that the content of INSERT entities (i.e. blocks) in DXF and DWG files should be loaded as a single point feature at the location of the INSERT.
- **DXF/DWG: Create New Types from Layers** - if checked, this option will cause new Global Mapper types to automatically be created for every DXF/DWG layer name encountered for which a Global Mapper type does not already exist.
- **Show Pixel Location in Status Bar** - if checked, this option causes the native pixel location of the topmost raster or gridded elevation file to be displayed in the status bar as you move the cursor around in addition to the color and/or elevation data.
- **Use DOS Character Set for Default Label Fonts** - if checked, this option specifies that default display label fonts should use the OEM character set (code page 437) rather than the ANSI character set (code page 1252). This option can be helpful if you are having problem with accented characters not displaying correctly from some data sets (those data sets encoded in code page 437 rather than 1252).
- **Use Path to First Loaded File as Default Export Path** - if checked, this option specifies that when exporting a new file, the default export path will be the path of the first loaded file during this session rather than the path to the last exported file in any session.
- **Use CR/LF in World Files (TFW) Instead of LF** - if checked, this specifies that lines in generated world files will be terminated using a carriage return (CR) and linefeed (LF) character as is customary on Windows systems rather than just a LF character. Use this if your world files are not being recognized by your Windows-based applications.
- **Automatically Create Backup Copies of Workspace Files** - if checked, this option will cause your current workspace file to automatically be backed up every so often (i.e. after so many vector edits, etc.). These backup copies will be created in the same folder as the workspace file and have the suffix "auto_backupX", where X is a number from 0 to 9.
- **Lock Active Workspace File to Prevent Sharing** - if checked, this option prevents other users from opening and using the same workspace file that you are using while you have it open. This is useful in network environments where you don't want one person's work to accidentally overwrite anothers. If

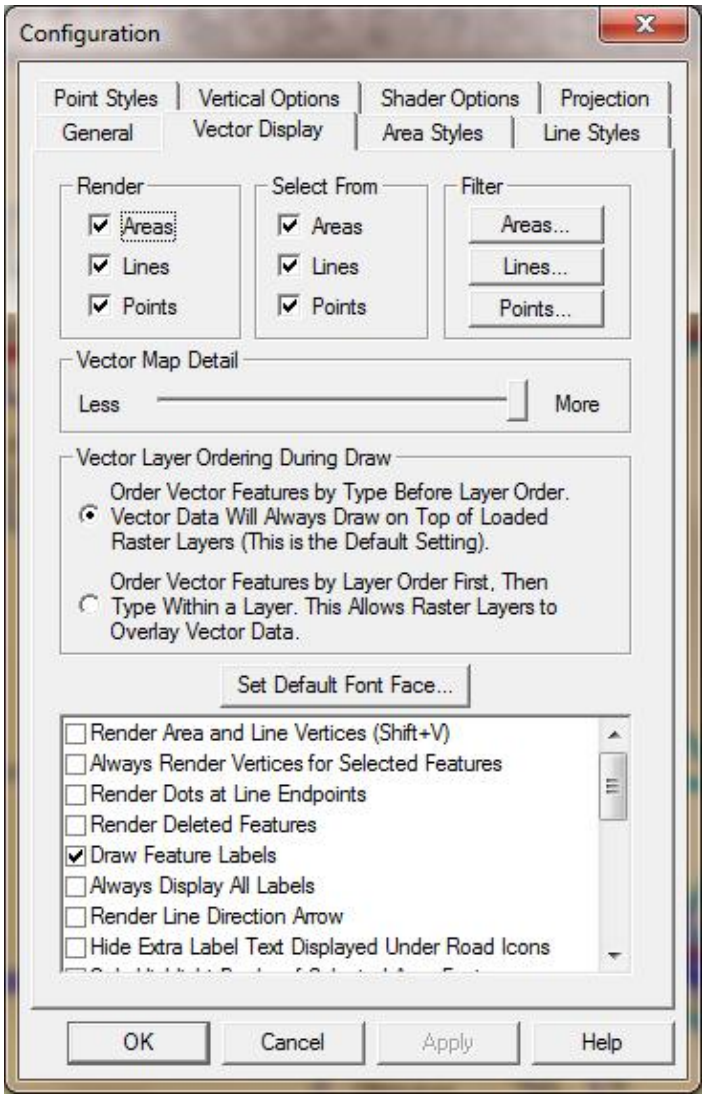
you try to open a locked workspace, it will automatically be opened in read-only mode, which will prevent you from overwriting the original workspace file when saving.

- **Center on Cursor when Zooming with Mouse Wheel** - when this option is checked (or when holding down Ctrl) and you rotate the mouse wheel over the map, the map will zoom in and out and maintain the location under your cursor at the same location rather than just zooming in and out on the current screen center.
- **Swap Zoom Direction Using Mouse Wheel or Hot Keys** - when this option is selected the direction of zoom when scrolling the mouse wheel or using the Page Up/Down keys will be reversed.
- **Export: Snap Export Bounds to Pixel Boundary if Possible** - when this option is checked the bounding box for an export will be adjusted so that the top left corner of the bounding aligns with the top left corner of a pixel in the imagery being exported. This is useful to eliminate any visual sub-pixel shift due to mis-alignment of the export bounds and the pixels in the input imagery.
- **Export: Keep Pixel if any Part is Inside Crop Area** - when this option is checked and you are cropping a raster/elevation export to a selected area feature, an exported pixel/cell will be kept if any corner of that cell is within the crop area rather than the default requirement of the center of the cell being in the crop area.
- **Disable Display of Pan Arrows on Map Edge** - when this option is checked, the arrow cursor that displays near map edges when most tools are active to allow easy panning are disabled, thus allowing use of the active tool all the way to the edge of the map display.
- **Always Display Lat/Lon in Status Bar in WGS84** - when this option is checked the lat/lon location displayed on the right side of the status bar will always be in the WGS84 datum rather than whatever datum is selected on the Projection tab of the Configuration dialog.
- **Disable Automatic Interpolation of Resampled Exports** - if checked, exported raster layers will only be interpolated if the anti-alias (interpolation) option for that layer is checked, rather than interpolation occurring for any reprojected or resampled export.
- **Disable Automatic Interpolation of Zoomed-Out Display** - if checked, this option disables the automatic interpolation/anti-aliasing done when zoomed way out on raster/imagery layers. This can increase the drawing speed when zoomed out on data, at the expense of a worse display for most maps.
- **Auto-Fake Location of Unpositioned Rasters** - if checked, this options causes the location of any un-positioned raster files to automatically be faked to allow display. This means rather than being prompted to rectify, fake the position, or cancel the load, the "fake position" option would just be chosen automatically.
- **Export Old Format PRJ Files** - if checked, this option specifies that the old, mostly unsupported, ESRI PRJ format be used when PRJ files are saved rather than the default new WKT projection format that is used by default.
- **Include Datum Transformations in PRJ Files** - if checked, this option will cause any generated WKT PRJ files that use a datum based on a 3-parameter Molodensky or 7-parameter Bursa Wolfe transformation to include that transformation as a TOWGS84 field in the PRJ file. Note that some products (i.e. ESRI ones) won't accept a PRJ file with the TOWGS84 field, which is why it isn't always included.
- **Create PRJ Files with .PRJ After Original File Extension** - if checked, this option specified that any export that generates a PRJ file will append the .prj to the entire filename rather than replacing the file extension with .prj. So if you exported a file named test.ecw with a PRJ file, you would get test.ecw.prj for this export rather than test.prj.

The *Restore Default Settings* button will restore all Global Mapper settings from the Configuration dialog to their default values.

Vector Display Options

The *Vector Display* panel (pictured below) controls options for the display of vector data (areas, lines, and points).



The *Render* section contains the settings for which types of vector features (areas, lines, or points) are to be displayed when loaded. You can use these settings to turn off an entire class of features all at once. For a finer degree of control, see the *Filter* section described below.

The *Select From* section contains the settings which determine which vector object types (i.e. areas, lines, points) the Pick Tool will consider when selecting objects.

The *Filter* section allows you to select which specific area, line, and point feature types you wish to display. By default, all feature types are displayed.

The *Vector Map Detail* setting controls how much decluttering of displayed vector data is done. This is useful when you have a large of amount of vector data loaded. For example, if you had all of the roads for an entire state loaded at once, you could slide the detail slider to the left to make minor roads been hidden until you zoomed in sufficiently far on the data. The rightmost (default) setting causes all vector data to be displayed regardless of zoom scale. This setting does not affect the display of raster or elevation data sets.

The *Vector Layer Ordering During Draw* settings control the order in which data from vector layers is displayed. The default setting (order by type before layer order) is that all vector data is drawn after any other loaded raster or elevation data, regardless of how the vector layers are ordered in the Overlay Control Center. All area features from all layers will be drawn first, followed by all line features from all layers, and finally all point features from all layers. Within each grouping (e.g. areas, lines, or points), the drawing order will be determined first by type, and then by layer ordering.

The second draw order option (order first by layer, then by type within a layer) specifies that the order of the vector layers in the Overlay Control Center should take precedence over all else when drawing. This means that if a vector layer is before a raster layer in the Overlay Control Center's draw order, that vector layer will draw underneath that raster layer if they overlap.

The *Set Default Font Face* option allow you to choose what font face should be used for all feature label displays where the font has not been explicitly set to something else for the feature.

The *Render Area and Line Vertices* option specifies whether each vertex along area and line features should be displayed with a large dot.

The *Always Render Vertices for Selected Features* option specifies whether each vertex along area and line features selected with the Digitizer/Edit Tool should be displayed with a large dot. Use this option rather than the *Render Area and Line Vertices* option above to only display vertices for features that you are actively editing in order to prevent excessive clutter on the map.

The *Render Dots at Line Endpoints* option specifies whether or not the start and end vertices of line features will be displayed with a large dot. You can use this instead of the *Render Area and Line Vertices* option if you just want to see line endpoints rather than all shape points.

The *Render Deleted Features* option specifies whether or not features that have been deleted by the user should be displayed.

The *Draw Feature Labels* option specifies turns labeling of features on or off globally. For more fine-grained control over which types are labeled, check the Area Styles, Line Styles, or Point Styles tab.

The *Always Display All Labels* option specifies whether or not feature labels should be allowed to overlap when drawing them on the screen. When this option is not checked (this is the default), labels that collide with other labels on the screen will be discarded until you zoom far enough in on the feature so that they can be displayed without overlapping any other labels.

The *Render Line Direction Arrow* option specifies whether or not a small arrow should be drawn on each line feature indicating in which direction the line vertices go. The arrow will point along the line towards the last vertex in the line.

The *Hide Extra Label Text Displayed Under Road Icons* option allows you to control whether or not any extra text displayed below road icons, like alternate names for the road, are displayed.

The *Only Highlight Border of Selected Area Features* option allows you to change the rendering style for area features selected with the Feature Info or Digitizer Tools so that only the border of the area is highlighted and the center is left unfilled.

The *Mark Sides of Road with Addressing Information* option allows you to have the sides of roads with recognized address numbering information to be marked with a series of parallel lines extending from the road

on the side(s) with known address information. This provides a visual way to see where addressing information is available.

The *Hide Display Labels that are Partially Offscreen* option allows you to hide any feature labels that don't entirely fit on the screen. This can be useful when exporting vector data to a raster format and also gridding the export into multiple pieces. This option should allow a seamless result in that case.

The *Add MODIFIED_DATE to Modified Vector Features* option controls whether or not a MODIFIED_DATE attribute is automatically added to vector features when they are changed in some way.

The *Iconize Road Names on Import (Some Formats)* option controls whether or not the specified name for road line types is checked on import to see if it should result in an iconized road name display (such as for interstates and major highways). This is only done for formats which do not already have their own built-in iconization (such as Tiger/Line and USGS DLG files). For example, this will work for formats like Shapefiles and MapInfo MIF/MID files (among others).

The *Fix Line Label Position on Longest Segment* option controls whether or not the label displayed for line features should move around to always be centered on the longest on-screen segment (the default unchecked behavior) or should remain fixed on the center of the longest segment of the line, regardless of whether it is on-screen or not. Checking this can prevent your line labels from jumping around as you zoom in and out, but can result in a lot of unlabeled lines if you zoom in too far.

The *Only Snap to Area and Line Vertices by Default* option controls whether or not the snapping behavior of the Digitizer Tool will snap to anywhere on existing area and line vertices (the default unchecked behavior) or will only snap to vertices on area and line features. Holding down the 'V' key when drawing will toggle this behavior.

The *Only Display Area Labels when Completely Inside Area* option allows you to easily disable the display of any area label when that label is not completely contained within the area feature that it is labeling. This is useful to keep area labels from displaying until you are zoomed in far enough on the area for a label to be appropriate.

The *Don't Add Measure Attributes to New Features* option allows you to disable the automatic adding of measure attributes, like LENGTH, PERIMETER, ENCLOSED_AREA, etc. to new area and line features created with the Digitizer Tool.

The *Make Duplicate Vertex Turn Off Area Border Segment* allows you to use duplicate area vertices to turn segments of the area border on and off. This is known as Pen Up/Pen Down display. How it works is that the border pen is on (down) at the start of the border. Whenver a duplicate vertex is encountered, then pen it turned off for the next segment. So if for example you had vertex 1, then a duplicate vertex 2 and 3, then non-duplicate vertices 4 and 5, you would get a border drawn from vertex 1 to vertex 2, then it would turn off for 3-4, then be drawn again for 4 onto the end.

The *Disable Snapping to Features in the Digitizer Tool* option allows you to disable automatic snapping to nearby features when drawing in the Digitizer Tool. If you check this option then snapping will be disabled by default and holding down the ALT key can be used to enable snapping (the default behavior is the reverse).

Area Styles

REFERENCE GUIDE ALERT!

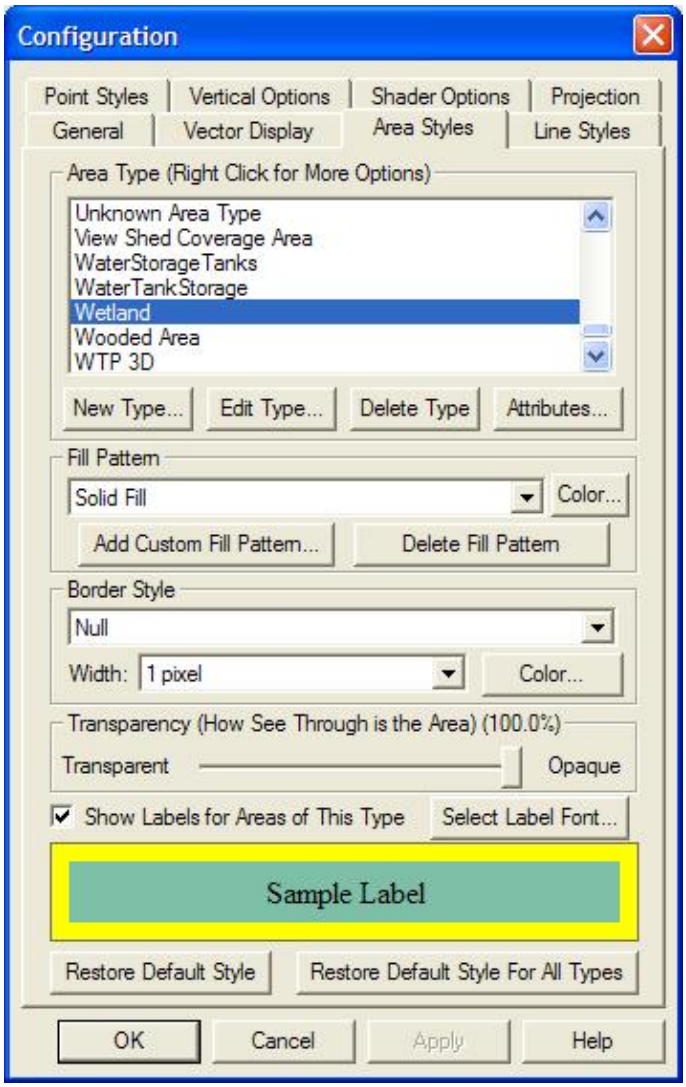
Built-In Area Types and Styles - A graphical reference guide to the area types and border/fill styles built-in to Global Mapper.

The *Area Styles* panel (pictured below) allows the user to configure how areas of a given type will be displayed in Global Mapper. The area fill and border style and color can be modified on a type-by-type basis. You can also use the *Add Custom Fill Pattern* option to provide your own image to use as a fill pattern. For transparent or translucent patterns, use a transparent PNG format image file when creating the custom fill pattern.

With the Transparency slider users can make solid filled areas partially see-through (translucent) in order to see data underneath the area. In addition, the *Show Labels for Areas of This Type When Present* option allows users to turn area labels off on a type-by-type basis.

The *New Type* button allows the user to create a new area feature type and specify how it should be displayed. The *Edit Type* button allows the user to edit area types that were previously created with the *New Type* button, and the *Delete Type* button allows the user to remove area types that were previously created with the *New Type* button. With the *Attributes* button you can specify a set of default attributes and values to use for new features of this type created using the Digitizer Tool.

If you right click on the list of types, a menu will appear allowing you to save and restore your style settings using a style file. This provides an easy way to setup a set of styles to use, then restore them at a later date for use with a particular set of data.



Line Styles

REFERENCE GUIDE ALERT!

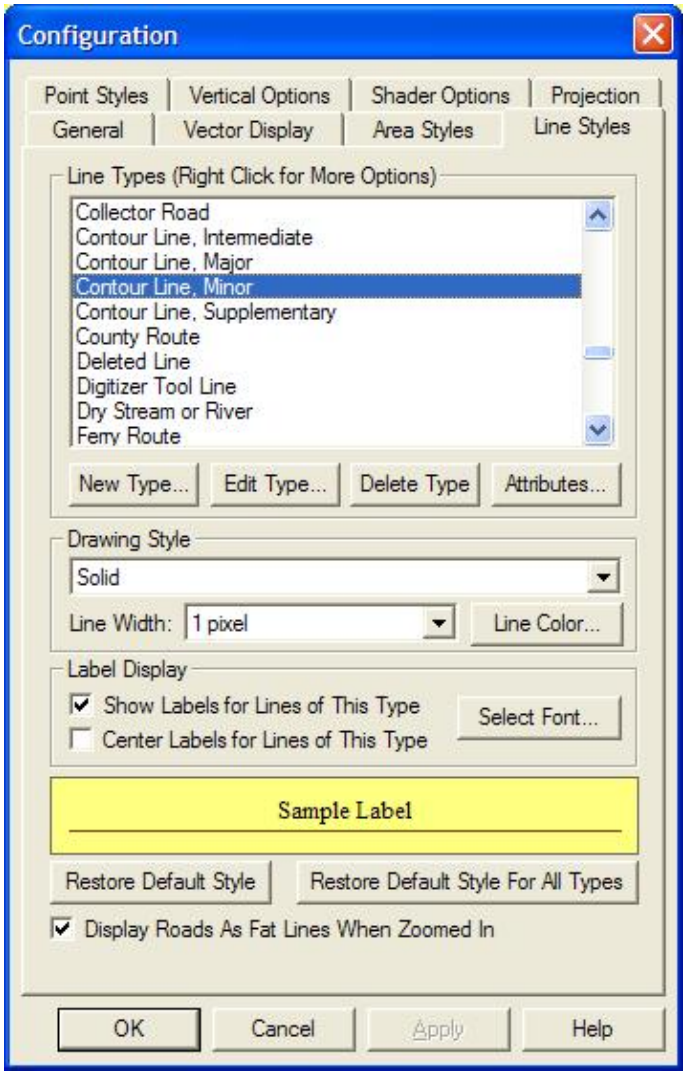
Built-In Line Types and Styles - A graphical reference guide to the line types and drawing styles built-in to Global Mapper.

The *Line Styles* panel (pictured below) allows the user to configure how lines of a given type will be displayed in Global Mapper. The line style, width, color, and label font can be modified on a type-by-type basis. When selecting a line width, you can choose a fixed width in screen pixels, which means that the line will draw the same width regardless of your zoom level, or you can choose the option to specify the line width as a *New Fixed Width in Meters*. When you do that your line will be drawn at a given number of meters in width, which means it will get thicker as you zoom in and smaller as you zoom out to maintain the same width in ground units.

In addition, the *Show Labels for Lines of This Type When Present* option allows users to turn line labels off on a type-by-type basis. The *Display Roads As Fat Lines When Zoomed In* option allows users to turn on/off the "fattening" of road lines when zoom in tight on them.

The *New Type* button allows the user to create a new line feature type and specify how it should be displayed. The *Edit Type* button allows the user to edit line types that were previously created with the *New Type* button, and the *Delete Type* button allows the user to remove line types that were previously created with the *New Type* button. With the *Attributes* button you can specify a set of default attributes and values to use for new features of this type created using the Digitizer Tool.

If you right click on the list of types, a menu will appear allowing you to save and restore your style settings using a style file. This provides an easy way to setup a set of styles to use, then restore them at a later date for use with a particular set of data.



Point Styles

REFERENCE GUIDE ALERT!

Built-In Point Types and Symbols - A graphical reference guide to the point types and symbols built-in to Global Mapper.

The *Point Styles* panel (pictured below) allows the user to configure what symbol will be used to display points of a given type and at what angle, if any, to rotate the symbol when displaying it on the map. Symbols can be rotated relative to either the map display (where 0 degrees is always straight up) or relative to true north, where 0 degrees always points directly to the North Pole. Rotated symbols are good for use in geology maps and for adding things like north arrows to your maps.

You can also press the *Scale* button to scale a point symbol to make it larger or smaller. For example, to double the size of a symbol use a scale of 2.0, whereas to make a symbol half its original size, use a scale of 0.5. You can also specify a symbol size in meters. This will automatically scale the point so that it is always the specified number of meters tall on the map regardless of zoom level.

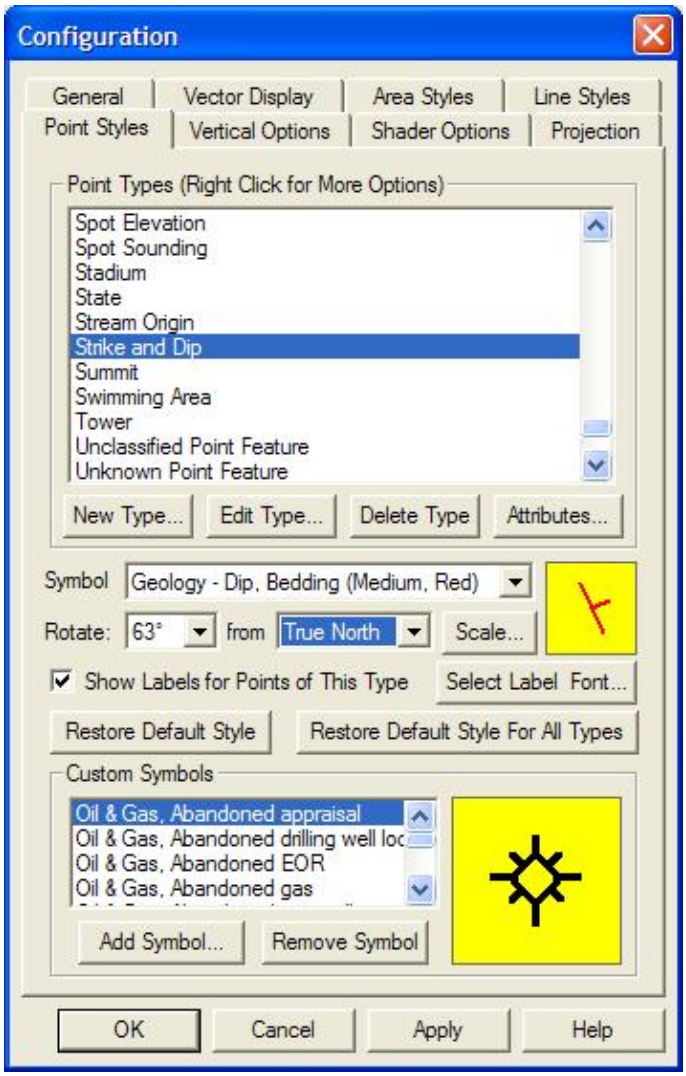
The symbol selection list also includes several option at the top of the list to select symbols of common shapes, like dots, squares, diamonds, etc. with a user-specified size and color.

In addition, the *Show Labels for Points of This Type When Present* option allows user to turn point labels off on a type-by-type basis. The *Custom Symbols* section allows users to create new symbols from their own bitmap and icon files which they can then use as the symbol to display for a given type.

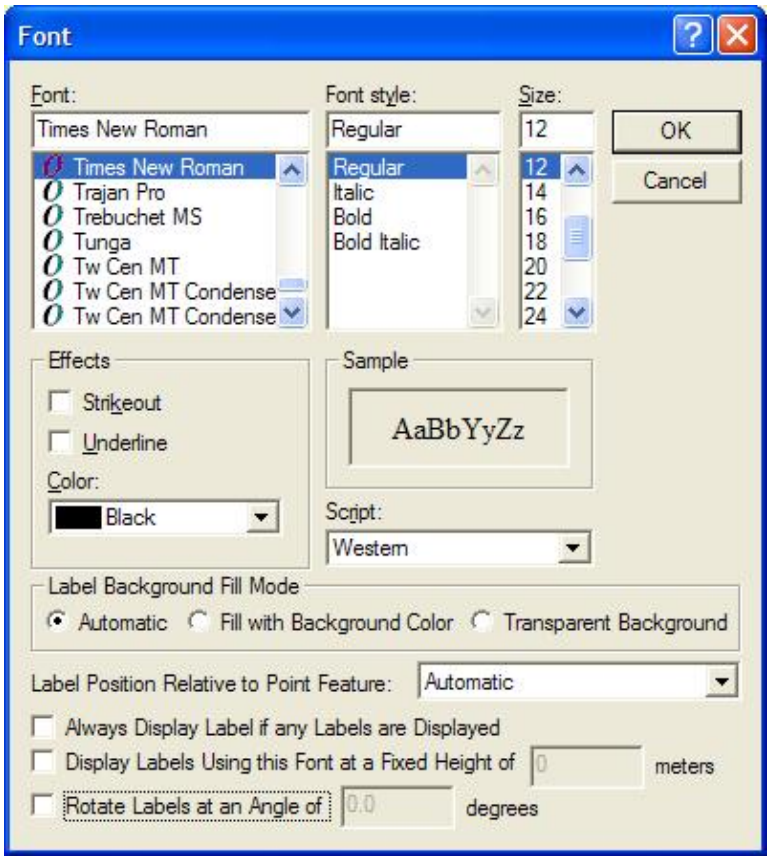
The *New Type* button allows the user to create a new point feature type and specify how it should be displayed. The *Edit Type* button allows the user to edit point types that were previously created with the *New Type* button, and the *Delete Type* button allows the user to remove point types that were previously created with the *New Type* button. With the *Attributes* button you can specify a set of default attributes and values to use for new features of this type created using the Digitizer Tool.

If you right click on the list of types, a menu will appear allowing you to save and restore your style settings using a style file. This provides an easy way to setup a set of styles to use, then restore them at a later date for use with a particular set of data.

The *Custom Symbols* section allows you to add new point symbols that will be available for display from your own files. This includes support for transparent symbols from PNG, ICO, GIF, and 32-bit alpha BMP files, as well as symbols from JPG images. You can also add vector symbols from EMF, DXF and GM_SYM (Global Mapper Symbol) files. GM_SYM files are simply ASCII text files that the File->Open Generic ASCII Data File menu command couuld load, with 0,0 being the center of the symbol and the coordinates specified as pixels, with X increasing to the right and Y increasing to the top of the symbol. Vector symbols will scale much more cleanly than symbols based on images.

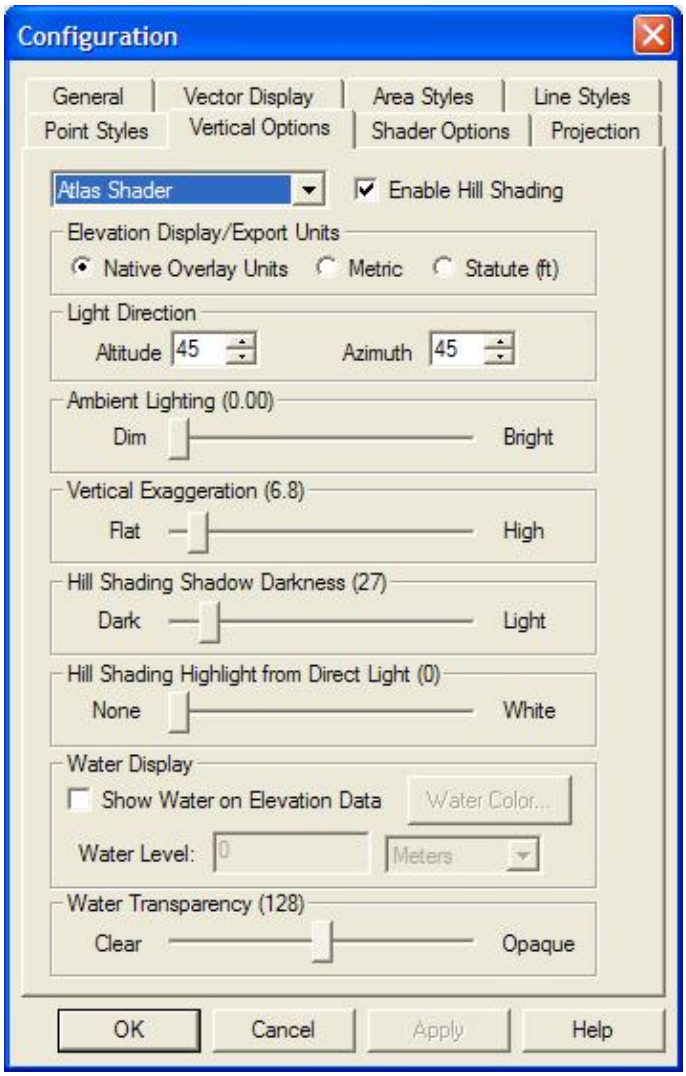


If you press the *Select Label Font...* button, the font selection dialog (pictured below) for the selected point type will appear. This dialog allows you to select the font to use for the point, as well as set up other label display options for the point, including where to position the label relative to the point, what angle (if any) to rotate point labels at, how to fill the background for the labels, and whether or not to display the labels at a fixed height in ground units rather than a fixed font size in pixels.



Vertical Options

The *Vertical Options* panel (pictured below) controls options for the display of elevation data.



The *Shader* selection box allows for the selection of the algorithm used to color and shade any loaded elevation data. The following shading algorithms are available:

- The **Atlas Shader** is the default shader. It generally provides good results for any loaded elevation data.
- The **Color Ramp Shader** displays ramps color from blue for low elevations to red for the highest elevations by default.
- The **Daylight Shader** colors all elevations the same and is only useful when hill shading is turned on.
- The **Global Shader** is designed for shading elevation data sets covering large areas of the earth such as Terrain Base and GTOPO30. The results are quite stunning for data sets such as these.
- The **Gradient Shader** moderates the color with elevation between the low elevation and the high elevation. The actual colors ramped between can be selected on the Shader Options panel.
- The **HSV Shader** maps the elevations onto the HSV (hue saturation value) color space. The mapping can be configured on the Shader Options panel.
- The **Slope Shader** colors loaded terrain data by the slope of the terrain rather than the absolute elevation. This shader allows you to identify the portions of the terrain that are relatively flat vs those that are relatively steep. The definitions of "flat" and "steep" are user configurable on the Shader Options panel.
- The **Slope Direction Shader** colors loaded terrain data by direction in which the terrain faces rather

than the absolute elevation. This shader allows you to easily identify things like the portions of the terrain that face south, or any other direction. The colors to use for each direction are user configurable on the Shader Options panel.
- If any custom shaders have been created, they will be available as well.

Use the *Enable Hill Shading* option to view elevation data as shaded relief. With this option off, the map appears flat, with elevations distinguished by color only. With it on, shadows are generated using the loaded elevation data along with the remaining settings on this panel.

The *Elevation Display Units* option allows you to modify the units that elevations will be displayed in on the status bar as you move the cursor over loaded elevation data.

The *Lighting Direction* options set the position of the light source (the "sun") for performing hill shading. Note that cartographic azimuth and altitude are used. This means that 0 azimuth means the sun is to the north, 90 azimuth means the sun is to the east, and so on. An altitude of 90 means that the sun is directly overhead, while an altitude of 0 means the sun is on the horizon.

Use the *Ambient Lighting* to brighten up dark looking data sets or dim bright looking data sets.

The *Vertical Exaggeration* setting is used to control the exaggeration of relief features.

The *Hill Shading Shadow Darkness* setting is used to control how dark that hill shading is allowed to make shaded areas. By default, the value of 0 allows shaded areas to go all the way to black. By moving this slider to the right you can cause shadowing to be capped in high relief areas, thus allowing the use of other controls to better bring out detail in low-relief areas.

The *Hill Shading Highlight from Direct Light* setting is used to display a whitened highlight area in terrain areas that are getting direct sunlight based on the lighting angle selected. The slider controls the amount of whitening highlight applied to those direct sunlight areas.

To enable the display of water on elevation data sets, check the *Show Water On Elevation Data* option.

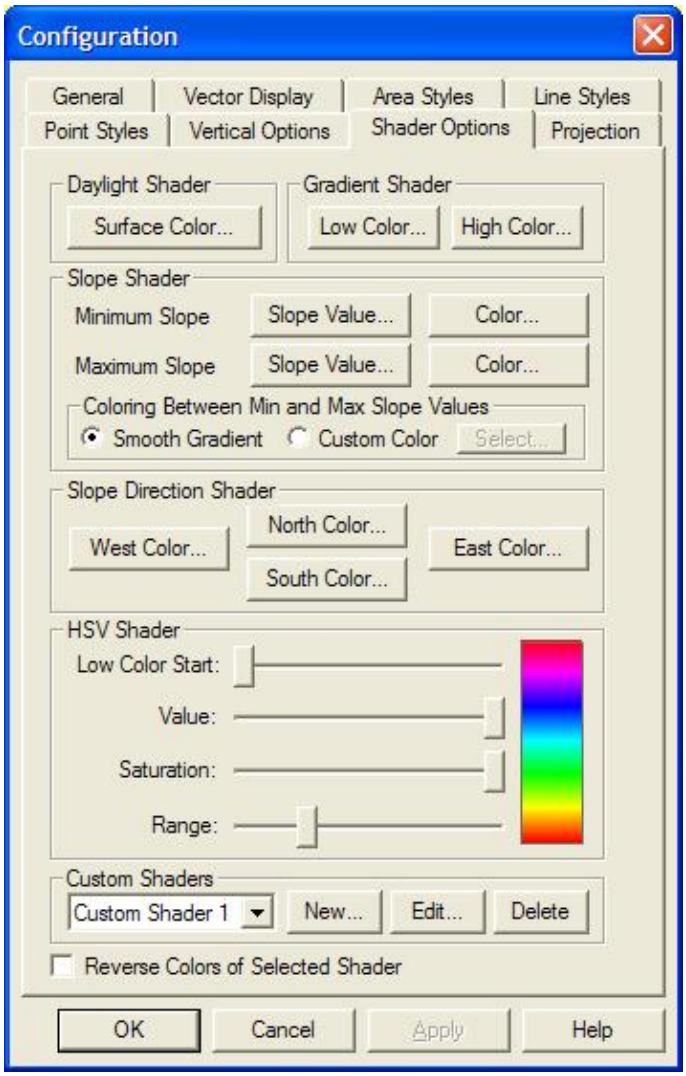
The *Water Transparency* controls the clarity of displayed water if configured to display water. Clearer water shows more underlying relief to show through, while opaque water allows none.

The *Water Level* setting controls the level at which water is displayed. The default is set at an elevation of 0 meters above sea level. Use this to simulate different flood and sea level change scenarios.

The *Water Color* options allows you to set the color of the water. The default is blue.

Shader Options

The *Shader Options* panel (pictured below) controls options for the display of elevation data using the daylight, gradient, slope, and HSV shaders (described above).



Daylight Shader

- *Surface Color*: Sets the calculated surface intensity color.

Gradient Shader

- *Low Color*: Sets the lowest elevation value color.
- *High Color*: Sets lowest elevation range color.

Slope Shader

- *Minimum Slope -> Slope Value*: Allows the user to set the slope at or below which the Minimum Slope Color is used.
- *Minimum Slope -> Color*: Specifies the color which all parts of the terrain with a slope at or below the Minimum Slope Value will be colored with.
- *Maximum Slope -> Slope Value*: Allows the user to set the slope at or above which the Maximum Slope Color is used.
- *Maximum Slope -> Color*: Specifies the color which all parts of the terrain with a slope at or above the Maximum Slope Value will be colored with.

- *Smooth Gradient*: Specifies that all portions of the terrain with a slope between the Minimum Slope Value and the Maximum Slope Value will be colored with a smooth gradient of colors that vary with the slope from the Minimum Slope Color to the Maximum Slope Color.
- *Custom Color*: Specifies that all portions of the terrain with a slope between the Minimum Slope Value and the Maximum Slope Value will be colored with a single color that can be modified with the *Select...* button.

Slope Direction Shader

- *East Color*: Allows the user to set the color to use for slopes facing directly East.
- *North Color*: Allows the user to set the color to use for slopes facing directly North.
- *South Color*: Allows the user to set the color to use for slopes facing directly South.
- *West Color*: Allows the user to set the color to use for slopes facing directly West.

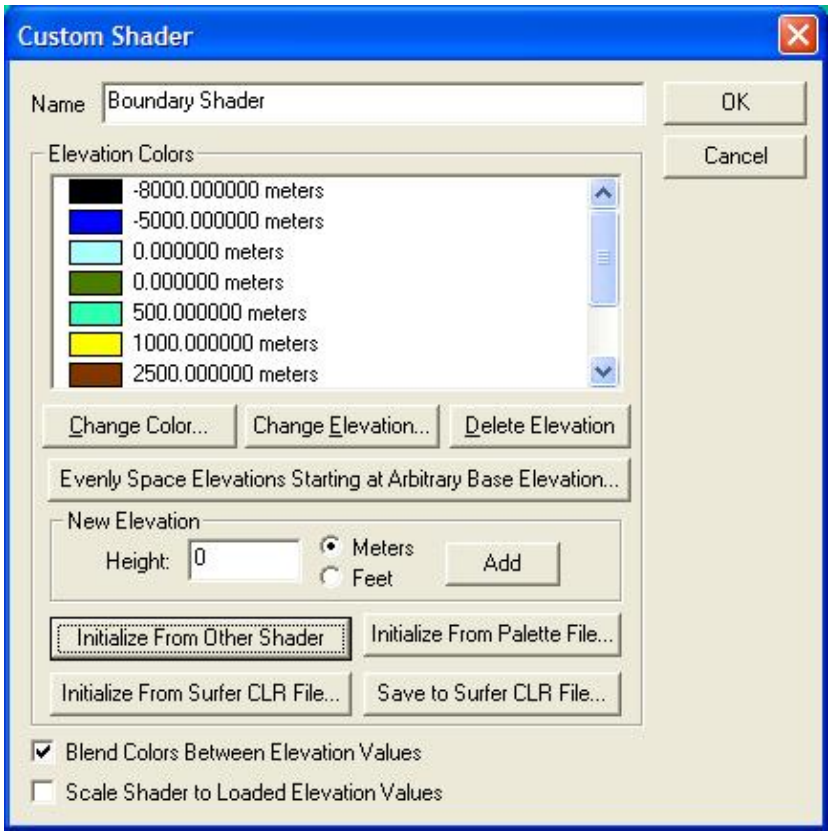
HSV Shader

- *Low Color Start* (Advanced): Sets where in the HSV color range the lowest elevation will be.
- *Value* (Advanced): Modifies the HSV value parameter.
- *Saturation* (Advanced): Modifies the HSV saturation parameter.
- *Range*: Modifies how much of the full HSV range is to be used. Increasing this value leads to color wraparound.

Custom Shaders

The *Custom Shaders* section allows the user to manage any custom shaders that they may have. Custom shaders allow the user to control exactly how elevation data is rendered so that the desired result can be obtained.

Pressing the *New...* button displays the *Custom Shader dialog* (pictured below) which allows the user to create a new custom shader. Pressing the *Edit* button display the same dialog, allowing the user to edit the currently selected custom shader. The *Delete* button removes the currently selected custom shader.



The *Custom Shader dialog* allows the user to specify how they want elevation data to be rendered. The *Name field* provides a place to enter the name to associate with the shader to allow the user to select it. The *Elevation Colors* section display the elevations and their color values associated with the custom shader. Pressing the *Change Color* and *Change Elevation* buttons allow the user to change the values associated with the current elevation selected in the *Elevation Colors* list. The *Delete Elevation* button allows the user to delete the currently selected elevation. New elevations can be added by entering the elevation (in the currently selected units) and pressing the *Add* button.

The *Evenly Space Elevations Starting at Arbitrary Base Elevation* button will allow you to quickly populate the list of elevation values with a series of evenly spaced values starting at some specified elevation. You can then assign the colors as desired after that. For example, you could use this to quickly populate the list with all elevations from 0 meters to 5000 meters with an elevation every 500 meters, then modify those as desired.

The *Initialize from Other Shader* button will allow you to initialize the list of color/elevation pairs to those used by either the Global Shader built into Global Mapper or another user-created custom shader. This allows users to easily create a slightly modified version of an existing shader if they'd like.

The *Initialize from Palette File* button allows you to initialize the list of color/elevation pairs from a color palette file in any recognized format (like a comma-delimited file of R,G,B components on each line). Since palette files don't contain elevation values, the elevations will be incremented by one for each color and set to automatically scale the colors between loaded elevation values.

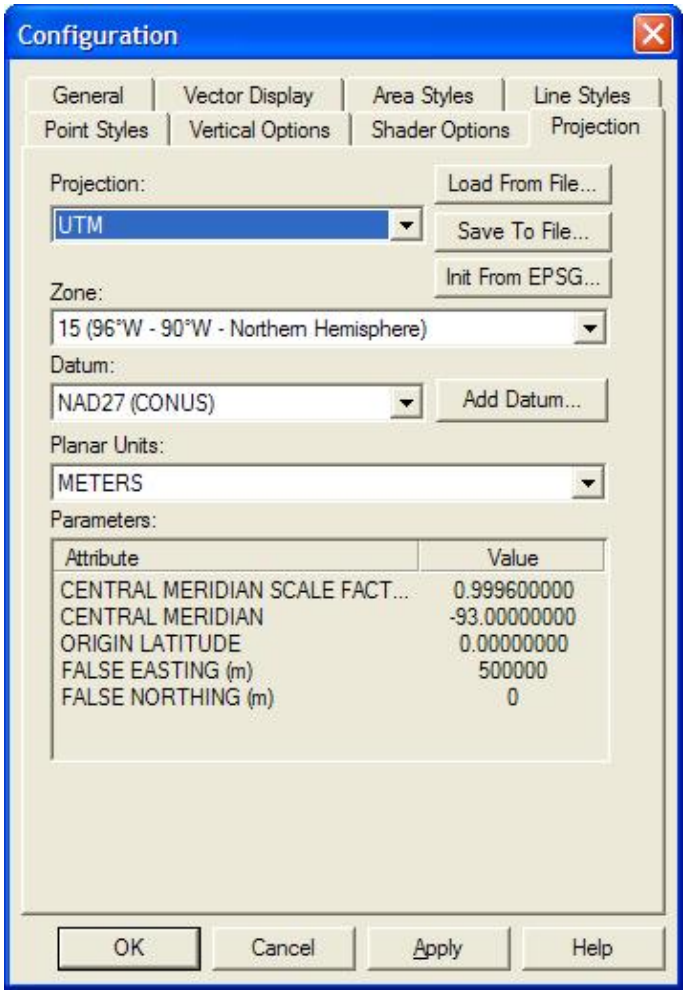
The *Initialize from Surfer CLR File* button allows you to initialize the list of color/elevation pairs with a a CLR file created by the Surfer application by Golden Software. You can use the *Save to Surfer CLR File* button to save your custom shader to a CLR file. This is useful for making copies of a custom shader and providing them to other users.

Elevations shaded with a custom shader will use the color specified for each elevation value. Any elevation values between two elevation/color values will be a blend of the two bounding colors if the *Blend Colors Between Elevation Values* option is checked. For example, if an elevation of 500 meters was set to black and an elevation of 1000 meters was set to white, an elevation of 750 meters would be colored a medium shade of gray. Any elevations below the minimum specified elevation will use the same color as the minimum elevation. The reverse is true for any elevations over the maximum elevation. If the blend colors option is not checked, any elevation between two elevation values will be set to the color associated with the lower of the elevation values.

If you would like the elevation values selected to scale to the elevation range of the currently loaded data rather than stay at fixed elevation values, check the *Scale Shader to Loaded Elevation Values*. This will make your shader behave similar to most of the built-in shaders, like the Atlas or Color Ramp shaders. For example, if you check this option and specify that an elevation of 0 meters is blue and 1 meter is red, and the actual loaded data has a range of 100 meters to 500 meters, then 100 meters will be blue and 500 meters will be red, with the values gradually shaded in between (if you have the blend colors option checked).

Projection

The *Projection* panel (pictured below) is used to modify the projection and datum that the currently loaded data is displayed in.



Use the *Projection* pull-down menu to select the projection you wish to view the currently loaded data in. The **Geographic** projection is really the absence of a projection. It is just a linear mapping of latitude/longitude to a grid. For a good description of most of the other supported projection systems and a discussion of the tradeoffs in using various projections, we suggest visiting http://www.progonos.com/furuti/MapProj/Normal/TOC/cartTOC.html.

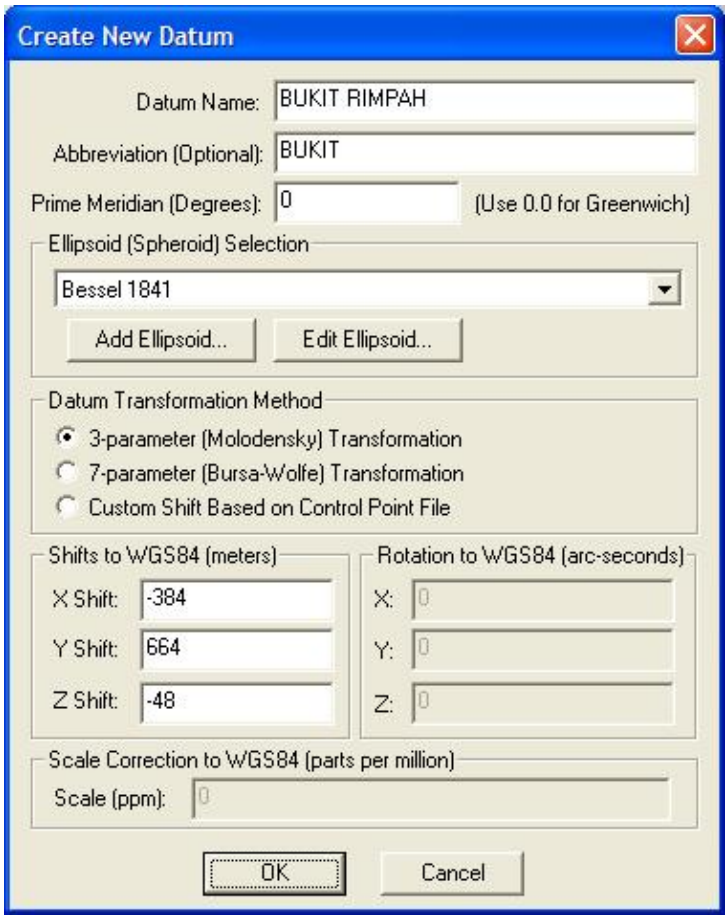
The *Datum* pull-down is used to select the datum to use in association with the projection. The most commonly used datums are WGS84, NAD27, and NAD83. If you find that the datum that you need is not available, you can use the *Add Datum* button to add your datum. When that button is pressed, the *Create New Datum* dialog (pictured below) is shown, allowing you to enter the parameters for either a 3-parameter Molodensky datum transformation or a 7-parameter Bursa-Wolfe datum transformation, or even specify a transformation defined by a text file with a list of control points.

If you choose the *Custom Shift Based on Control Point File* option, the text file that you select should have a series of lines defining the mapping from a lat/lon coordinate in the new datum and the corresponding lat/lon value in WGS84. This is a very easy way to define a datum if you don't know any transformation parameters, but do know the WGS84 coordinates for at least 2 coordinates in the new datum. The format of each line would be as follows:

```
deg_longitude_in_new_datum,deg_latitude_in_new_datum,deg_longitude_in_WGS84,deg_latitude_in_WGS
```

The *Abbreviation* field is what will be displayed for the datum name in the status bar. If your datum uses a prime meridian other than Greenwich, enter the longitude of the meridian used (relative to Greenwich) in the *Prime Meridian* entry box.

The datum information will be stored in the custom_datums.txt file in the Global Mapper Application Data folder (see the Help->About dialog for the location of this folder), so to share your datums just copy that file to that folder on another user's computer. If a needed ellipsoid is not built in to Global Mapper, use the *Add Ellipsoid* button to add a new one or *Edit Ellipsoid* to edit an existing custom ellipsoid definition.



The *Planar Units* pull-down select the ground units to use with the projection.

The *Zone* selection allows you to select the zone for use with the **UTM**, **State Plane**, **Gauss Krueger**, and other zoned projections.

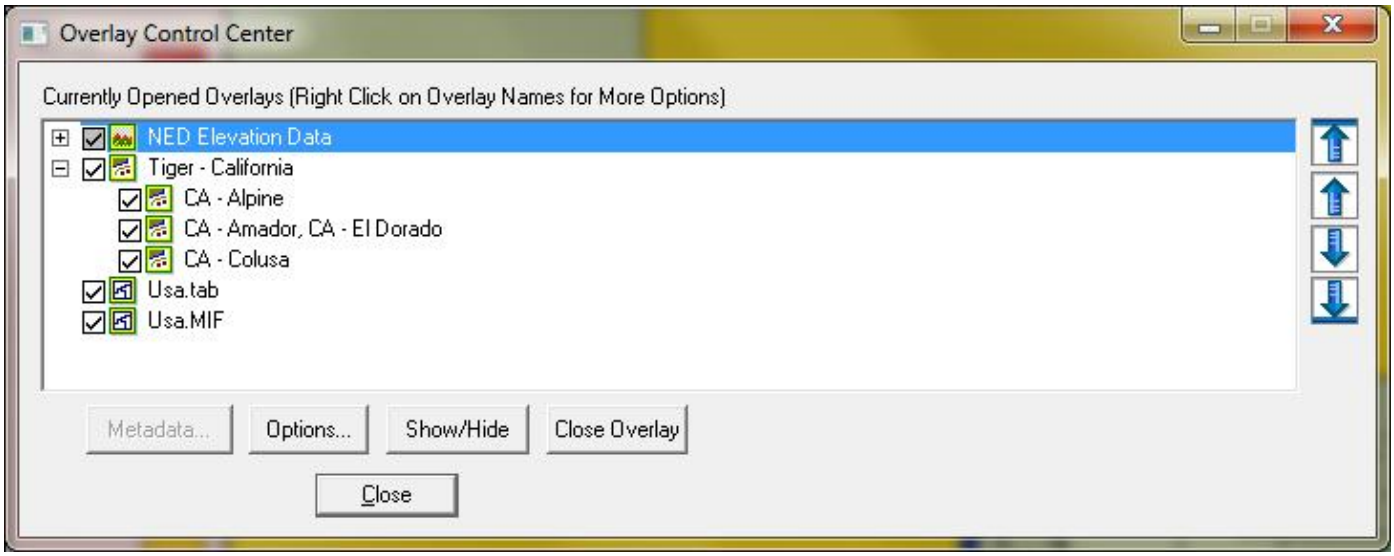
For those projections that require additional parameters to fully define them, the *Attributes* table allows you to enter the values for each applicable parameter.

You can save the currently selected projection to a PRJ file using the *Save to File* button. Previously saved PRJ files can be loaded using the *Load from File* button. By default, the PRJ file will be saved in the newer WKT (well-known-text) format used by most products. There is an Advanced Option on the General tab of the Configuration dialog allowing the older ESRI PRJ format to be exported instead if you would like. If for some reason a WKT-representation of the projection cannot be generated, the old ESRI PRJ format will be written out instead.

The *Init From EPSG* button allows you to initialize a projection definition based on a numeric EPSG projected coordinate system definition. There are numerous built-in EPSG code definitions, but by no means is there an exhaustive set. You can add your own EPSG code definitions (or modify built-in ones) by modifying the epsg_codes.txt file installed in your Global Mapper installation folder. The format is described in the file header. You must re-start Global Mapper after changing this file for the changes to have any effect.

OVERLAY CONTROL CENTER

This section describes the Overlay Control Center dialog (pictured below). This dialog serves as the central control center handling all currently loaded data sets (overlays).



Currently Opened Overlays

This is a list of the all currently opened overlays. You can select an overlay by clicking on its name. Multiple overlays can be selected using the shift and control keys while clicking on overlays in the list. If the overlay is currently hidden, it is indicated to the left of the overlay description. Double-clicking on a layer automatically brings up its Options dialog. If you hold down the 'M' key while double-clicking the Metadata dialog for the layer will be displayed instead.

You can right click on the list of currently opened overlays to display a list of options available to perform on the selected overlays. Examples of available options include the following:

- Create Elevation Grid from 3D Vector Data - This allows you to create an elevation grid from part or all of any vector features in the selected overlays that contain elevation data.
- Modify Image Position - This allows you to reposition imagery and vector data that was not correctly positioned when loaded, including imagery that was manually rectified. See the option below if you just want to shift an entire layer by some distance.
- Setup What Zoom Levels to Display Selected Layer(s) At - This option allows you to control what zoom levels/scales that the selected layer(s) will display at. You can choose to have layers only display below a certain zoom scale or between scales, or when the map is a certain percentage of the map display size or the map resolution reaches a certain level.
- Shift Selected Layer(s) a Fixed Distance - This option provides a quick way to shift any layer some fixed distance in any direction. When selected a dialog is presented allowing you to specify the distance to shift the selected layers in the X and Y direction or some distance along a particular bearing.
- Scale Layer Based on Actual Length of Selected Line - This option allows you to scale a selected layer based on a user-specified length of a selected line feature in that layer. This is useful if you know the actual length of a line feature in a vector layer and want to scale the layer so that the line length is correct without caring about where on the earth the layer is placed. The line that you know

the length of should be selected with either the Feature Info or Digitizer Tool.

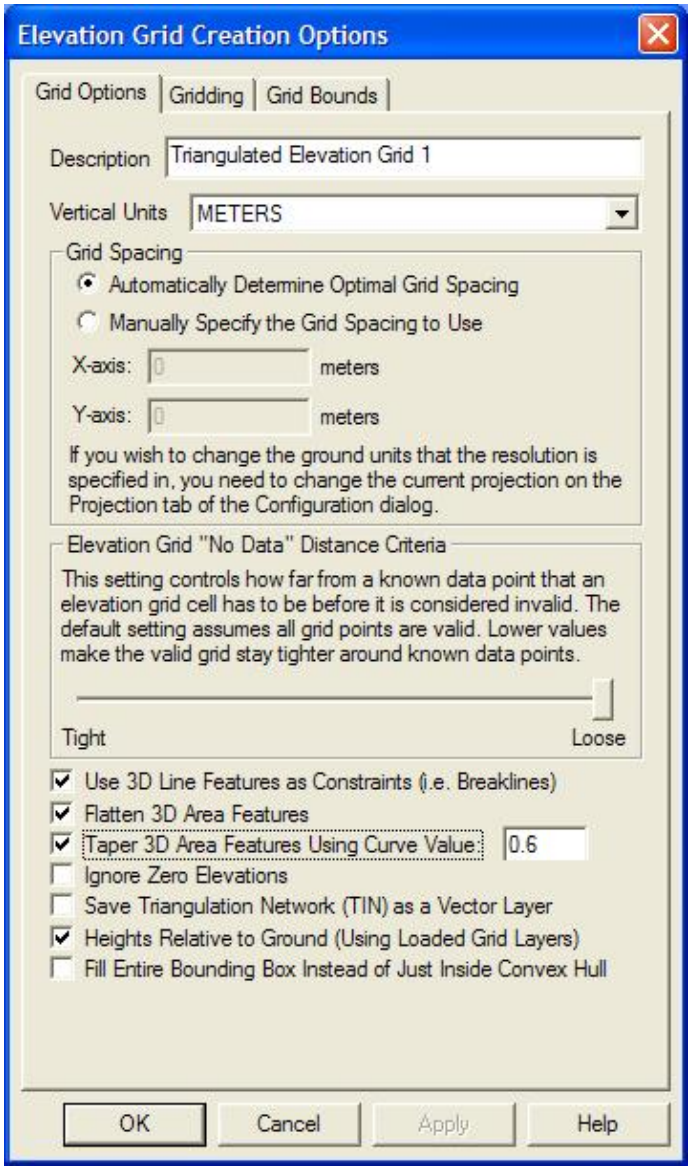
- Create Workspace File from Selected Layer(s) - This option allows you to generate a workspace just containing the selected layer(s) and their display options. This workspace can later be loaded with the File->Load Workspace menu command.
- Create Map Catalog from Selected Layer(s) - This option allows you to generate a map catalog file containing the selected layer(s). This map catalog can later be loaded with the File->Open Data File menu command.
- Zoom to Selected Layer(s) - This causes the view to be zoomed such that the full extents of the selected overlays are visible.
- Zoom to Full Detail For Layer - This causes the view to be zoomed such that a single sample/pixel in the selected overlay will take up approximately one pixel on the screen.
- Set Group to Assign to Selected Layer(s) - This allows you to specify a group to assign the selected layer(s) to. If layers are in a group, they will be organized under that group name in the Control Center and you can easiliy collapse them into a single item in the list of layers and operate on all items in the group by selecting the parent group item.
- Create Area Features From Selected Layer Bounds - This causes new rectangular area features with the name of the overlay as the display label to be created for each selected layer in the User-Created Features Layer. This is useful for creating an image index as the filename of the layer will also be saved as an attribute of the area feature created from it.
- Create Point Features at Elevation Grid Cell Centers - This causes a new layer to be created for each selected elevation grid layer with a spot elevation point feature at each grid cell center location. This provides a handy way to edit elevation layers as you can edit the elevation attribute of the created points or remove bad points, then create a new elevation grid from the layer.
- Create Area Features from Equal Values in Selected Layer - When a single raster or elevation grid layer is selected (with the exception of online sources), this option appears and allows you to create area features covering each distinct color or elevation value encountered in the raster file. This is useful for automatically creating areas for things like land cover raster files in a vector format.
- Find Extreme (Min/Max) Elevation Values in Selected Layer(s) - This scans the selected elevation grid layers to find the minimum and maximum elevation values and reports both the values and their locations to the user. The complete list (up to 10,000 shared location) will be saved to a file, and a shorter list presented to the user.
- Change View Shed Layer Color - This allows you to edit the color used to display the coverage area for a selected view shed layer.
- Edit View Shed Parameters and Recalculate - This allows you to edit the calculation parameters for a view shed layer and then update the results.
- Open Selected Map Folder in Windows Explorer - This causes the Windows Explorer application to be opened to the folder containing the selected map file.
- Split Into Separate Layers Based on Description/Attribute Value - This option allows you to create new layers by splitting the selected layer(s) into new layers based on a particular attribute value or by the description, type, or name of each feature. The new layers will be grouped together using the name of the original layer unless the original layer was already in a group.
- Allow Feature Selection from Selected Layer(s) - This option controls whether or not vector features from this layer can be selected using either the Feature Info or Digitizer Tools.
- Select All Features in Selected Layer(s) with Digitizer Tool - This option causes all features in the selected layer(s) to be selected with the Digitizer Tool.
- Close All Hidden Layers - This option causes all layers that are currently marked as hidden (i.e. have their display checkbox unchecked) to be closed.
- Hide All Offscreen Layers - This option causes all layers that are currently completely off of the main map view to be marked as hidden (i.e. have their display checkbox unchecked).
- Reorder Maps by Resolution/Description/Location - This option displays a dialog allowing you to choose a method by which to reorder the maps in the list. This includes sorting alphabetically, by

resolution, or spatially sorting the maps.

- Move Selected Overlay(s) Up/Down - These options allow you to modify the order in which overlays are displayed in the main view. The large arrow buttons on the right-hand side of the dialog also perform these functions.

Create Elevation Grid from 3D Vector Data

Selecting the *Create Elevation Grid from 3D Vector Data* option on the popup menu that appears when right-clicking on vector layers in the Overlay Control Center displays the *Elevation Grid Creation Options* dialog, pictured below. Using this dialog, you can configure how you want the elevation grid to be created using the selected vector data as well as what portion of the selected overlays to use when creating the elevation grid. You can also use the *Gridding* tab to specify that your data should be gridded in sections. This makes it possible to grid data sets that are too large to grid all at once.

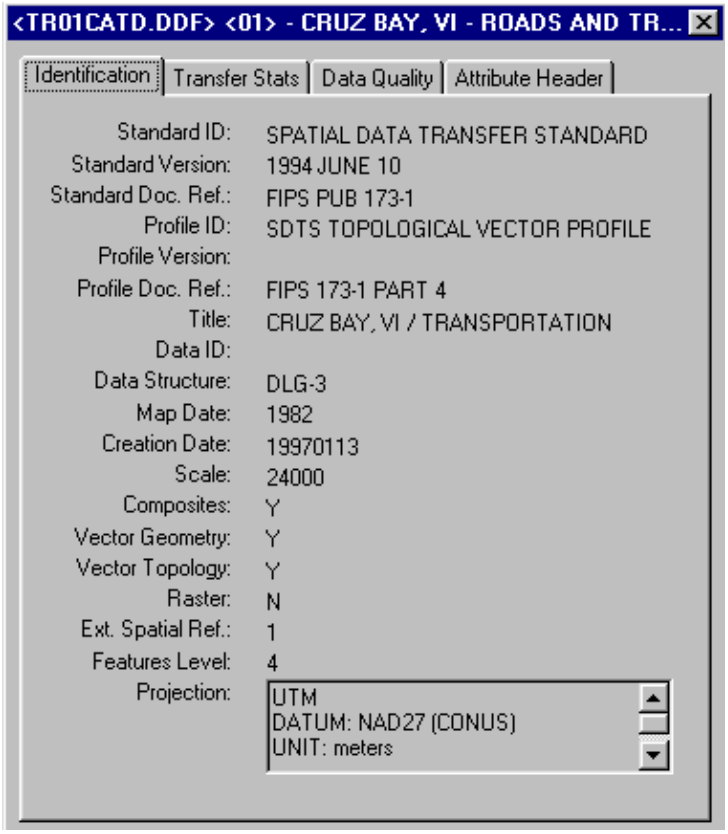

Elevation Grid Creation Options
Grid Options
Gridding
Grid Bounds
Description
Triangulated Elevation Grid 1
Vertical Units
METERS
Grid Spacing
Automatically Determine Optimal Grid Spacing
Manually Specify the Grid Spacing to Use
X-axis:
meters
Y-axis:
meters
If you wish to change the ground units that the resolution is specified in, you need to change the current projection on the Projection tab of the Configuration dialog.
Elevation Grid "No Data" Distance Criteria
This setting controls how far from a known data point that an elevation grid cell has to be before it is considered invalid. The default setting assumes all grid points are valid. Lower values make the valid grid stay tighter around known data points.
Tight
Loose
Use 3D Line Features as Constraints (i.e. Breaklines)
Flatten 3D Area Features
Taper 3D Area Features Using Curve Value
0.6
Ignore Zero Elevations
Save Triangulation Network (TIN) as a Vector Layer
Heights Relative to Ground (Using Loaded Grid Layers)
Fill Entire Bounding Box Instead of Just Inside Convex Hull
OK
Cancel
Apply
Help

The following options are also available when generating the grid:

- Use 3D Line Features as Constraints (i.e. Breaklines) - If this option is checked, any line and area features that have elevation values associated with them will be treated as constraints/breaklines. This will ensure that elevation values along the line/area boundary will be consistent with the elevation that should be along the line.
- Flatten 3D Area Features - If you have any area/polygon features with elevation in the selected layers that you are gridding, they will be treated as flattened areas rather than just additional 3D data points/constraints. This allows you to create flattened areas like lakes and also nice terrain surfaces from things like building models. If only 3D area features are present, any grid locations outside of the areas will be marked as invalid, otherwise the grid locations within areas will just be flattened to the area heights and the remainder of the grid will be generated as usual.
- Taper 3D Area Features Using Curve Value - If you have any area/polygon features with elevation in the selected layers that you are gridding and you also checked the option to flatten 3D area features, the taper option allows you to specify that rather than making the areas absolutely flat, the edges should be tapered with the area elevation existing near the centroid of the area and the elevation applied for the area dwindling to zero as you reach the area edge. The curve value specifies the exponent to apply to the percent distance a sample location is between the area centroid and the area edge to adjust the height applied at that location. Values less than 1 will make the edge steepness progressively greater (i.e. flatter at the middle, then steep edges), while values larger than one cause the steepness to be near the area centroid and flatter towards the edges, while a value of 1 provides for a linear taper. For example if you want to simulate a sand bunker for a golf course, a value of around 0.5 provides a decent simulation of a bunker.
- Ignore Zero Elevations - If checked, this option will cause any features with an elevation value of zero to be ignored. This is useful if you have a data set where features with no known elevation are marked with an elevation of zero.
- Save Triangulated Network (TIN) as a Vector Layer - If checked, this option will cause a separate vector layer with area features for each 3D triangle created as part of the triangulation and gridding process. This is known as the TIN surface.
- Heights Relative to Ground - If you check this option, all elevation values from the selected vector layers will be treated as relative to the height of any loaded underlying terrain surface (like a DEM). This is very handy for doing things like creating building models where you just know the building height above ground and not above sea level.
- Fill Entire Bounding Box Instead of Just Inside Convex Hull - If you check this option, the generated elevation grid will contain valid values filling the entire bounding box specified for the gridding operation. Otherwise, the valid values will only fill out to the convex hull polygon of the data being gridded.
- Export Grids Directly to Global Mapper Grid Files - If checked, this option will cause the generated elevation grid file(s) to be directly exported to Global Mapper Grid (GMG) files. This is useful when you are triangulating and gridding a very large collection of data and also using the Gridding tab to split the operation into smaller pieces. By directly exporting the results to GMG files you can create elevation grids that normally would not all fit into memory.

Metadata

Pressing the *Metadata...* button displays metadata for the selected overlay. The actual metadata dialog displayed depends on the type of the selected overlay. The metadata dialog for a SDTS DLG is shown below.



Options

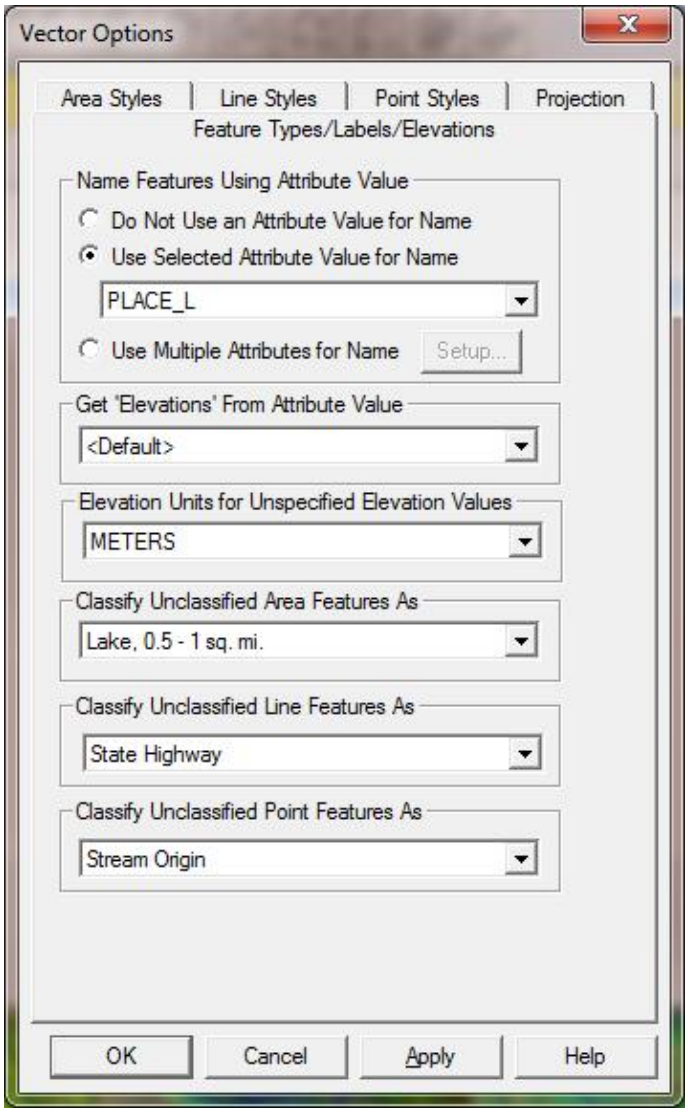
Pressing the *Options...* button displays a dialog containing the available display options for the selected overlay(s). Options can be set on multiple raster or elevation overlays at the same time. The available display options depend on the type of the selected overlays. The following display options are used:

- Vector Data Options
  - Feature Types/Labels/Elevations Tab
  - Area Styles Tab
  - Line Styles Tab
  - Point Styles Tab
  - Projection Tab
- Raster Data Options
  - Display Tab
  - Color/Contrast Adjustment Tab
  - Cropping Tab
  - Band Setup Tab
  - Palette Tab
  - Feathering Tab
  - Color Grade Tab
- Elevation Data Options
  - Display Tab
  - Alter Elevation Values Tab
  - Feathering Tab

Vector Data Options

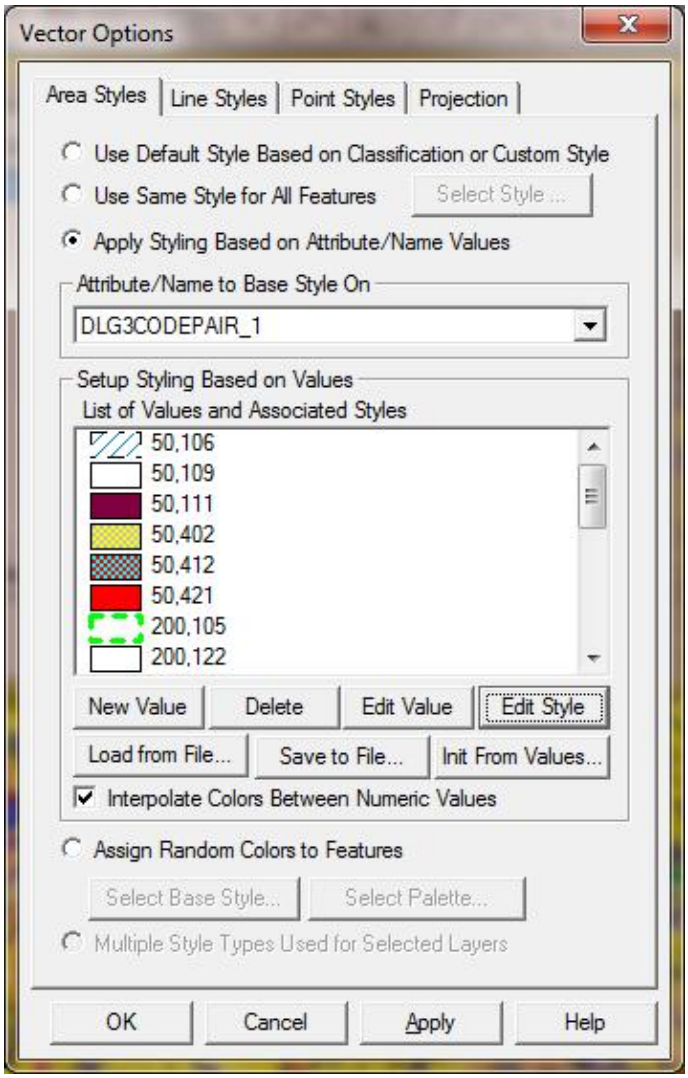
Selecting the *Options...* button while a vector (i.e. SHP, DXF, E00, etc) overlay is selected displays the *Vector Options* dialog (pictured below).

Feature Types/Labels/Elevations Tab



The *Feature Types/Labels/Elevations* tab provides the ability to specify which attribute field(s) (if any) to display as the name of features loaded from the vector file. You can also select which attribute field (if any) to use for the "elevation" value for the layer. By default, several attribute field names (like "ELEVATION", "ELEV", "ALTITUDE", "Z", etc.) are checked when an elevation value for the feature is needed. This option allows you to override this behavior and manually select the attribute to use. You can also select what units to assign to unspecified elevation values for the layer, such as per-vertex elevation values for 3D line and area features in the layer. Finally, there are also options available to select the classification to apply to unclassified area, line, and/or point features in the layer.

Area, Line, and Point Styles Tabs



The *Area Styles*, *Line Styles*, and *Point Styles* tabs provide the ability to customize how area, line, and point features found in the selected layer(s) are displayed. The following style settings are available:

- *Use Default Style Based on Classification or Custom Stlye* - This option is the default and specifies that features should be drawn and labeled using either the custom style applied to each feature, or the default drawing style for the classification assigned to each feature. You are configure the default drawing style for any particular classification on the Area Styles tab of the Configuration dialog, the Line Styles tab of the Configuration dialog, or the Point Styles tab of the Configuration dialog.
- *Use Same Style for All Features* - This option specifies that all features in the selected layer(s) should be drawn with the same drawing style, regardless of type or any custom style applied.
- *Apply Styling Based on Attribute/Name Values* - This option provides a way to base the drawing style on the value of a particular attribute. This is a powerful feature allowing you to assign a style to a particular value for a particular attribute. Any features whose value for the selected attribute/name matches the selected value will be assigned that style. If you have numeric values and the *Interpolate Colors Between Numeric Values* option is checked, any numeric values for the selected attribute/name that do not exactly match a value will find the two closest numeric values and interpolate the color values in between those numbers. Any features that do not have a matching attribute/name value will use the default style assignment for their type or the custom style if one has been set. You can also use wilcard (* and ?) characters in your attribute value to match on values matching some pattern. If you

want to initialize the list of attribute values and styles from those attribute values found in the selected layer(s), press the *Init from Values* button.

- *Assign Random Colors to Features* - This option specifies that each feature shall be assigned a random color, either from the full set of 24-bit colors, or from a collection of colors specified by the user in a palette. You can use the *Select Base Style* button to assign the base style whose color will be randomly assigned. For areas, if the selected style uses no area fill, then the area border color will be varied rather than the fill color. For point features, you need to have a dot or custom shape (like dot, diamond, square, etc.) selected as the symbol for the color randomization to work properly.

Projection Tab

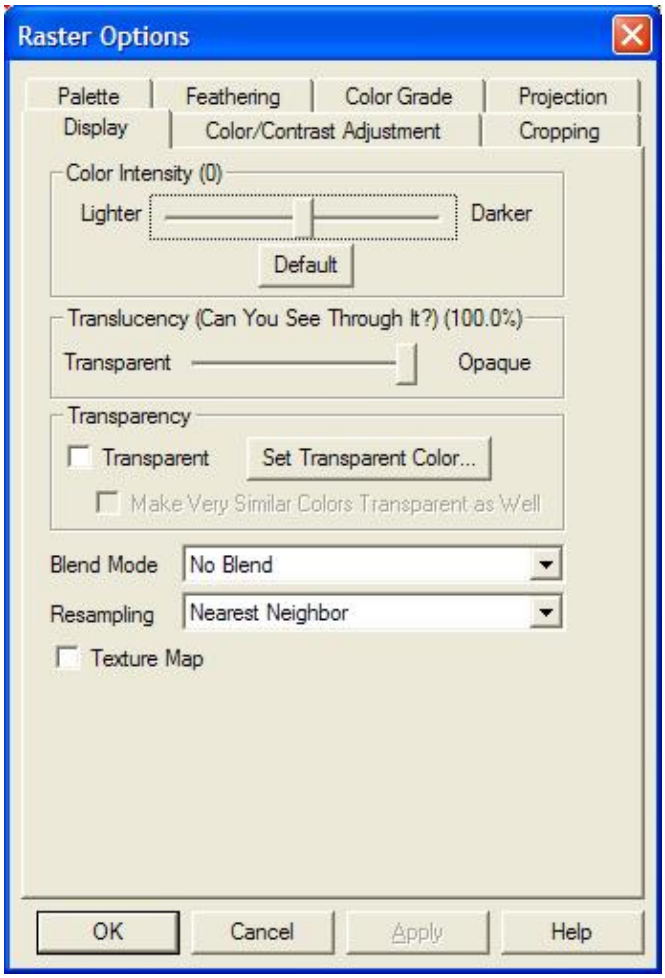
The *Projection* tab is used to reinterpret the raw vector data to a new projection. This is useful if the wrong projection was selected for the dataset when it was loaded, or if the data set itself indicated some incorrect data. This option is rarely used. You can however also use the *Elevation Units* control to specify what elevation units that values in the vector data that do not explicitly specify their units should use. This is useful to indicate if the values associated with 3D vector features or with the ELEVATION attribute for features are in feet or meters.

Raster Data Options

Selecting the *Options...* button while only raster overlays are selected displays the Raster Options dialog. The Raster Options dialog consists of several tabs, each allowing you to control various aspects of how the selected raster layers are displayed.

Display Tab

The Display tab (pictured below) contains controls allowing you to control the color intensity (brightness/darkness), color transparency, blending, anti-aliasing, and texture mapping of the selected layers.



The *Color Intensity* setting controls whether displayed pixels are lightened or darkened before being displayed. It may be useful to lighten or darken raster overlays in order to see overlaying vector data clearly.

The *Translucency* setting controls to what degree you can see through the overlay to overlays underneath the overlay. The default setting of Opaque means that you cannot see through the overlay at all. Settings closer to Transparent make the overlay increasingly more see-through, allowing you to blend overlapping data.

The *Blend Mode* setting controls how an overlay is blended with underlying overlays, in addition to the *Translucency* setting. These settings allow Photoshop-style filters to be applied to overlays, resulting in often stunning results. What you get from a particular set of overlays from a particular blend mode setting can often be hard to predict, so rather than try to understand what is technically happening for each blend mode it's best to just experiment with different ones until you find one that you like. The *Hard Light* setting seems to work well with satellite imagery overlaid on DEMs, but the others can be quite useful as well. For example, the *Apply Color* setting is useful for applying color to a grayscale overlay, such as using a low-resolution color LANDSAT image to colorize a high-resolution grayscale satellite image. The *SPOT Natural Color* blend mode combines the color channels in the topmost layer using the common algorithm for generating natural color imagery from images from the SPOT HRV multi-spectral sensor [Red = B2; Green = (3 * B1 + B3) / 4; Blue = (3 * B1 - B3) / 4]. The *Pseudo Natural Color* blend mode combines the color channels within a single image using a common algorithm for generating natural color imagery from CIR imagery. The *Color to Grayscale* blend mode converts a color image to grayscale.

The *Transparent* option allows a particular color (or colors) to be displayed transparently, making it possible to see through a layer to the layers underneath. For example, when viewing a DRG on top of a DOQ, making the white in the DRG transparent makes it possible to see much of the DOQ underneath. Pressing the *Set Transparent Color...* button allows the user to select the color (or multiple colors for palette-based files) to treat as transparent in the selected overlay(s) as well as save the palette for palette-based files to a color palette (.pal) file. If you also check the *Make Very Similar Colors Transparent as Well* option, any colors that are a very similar color to the selected transparent color will also be displayed transparently. This is useful for getting rid of colors in lossy formats like JPG and ECW where the colors are not exact.

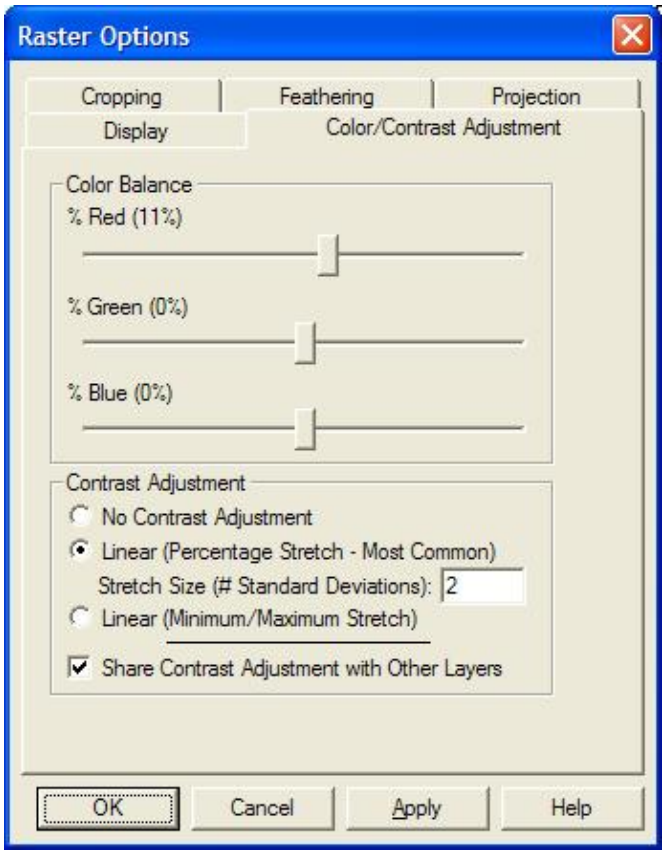
The *Resampling* option allows you to control how the color value for each displayed/export location is determined based on the values in the file. The following resampling methods are supported:

- *Nearest Neighbor* - simply uses the value of the sample/pixel that a sample location is in. When resampling or reprojected an image this can result in a stair-step effect, but will maintain exactly the original color values of the source image.
- *Bilinear Interpolation* - determines the value of a new pixel based on a weighted average of the 4 pixels in the nearest 2 x 2 neighborhood of the pixel in the original image. The averaging has an anti-aliasing effect and therefore produces relatively smooth edges with hardly any jaggies.
- *Bicubic Interpolation* - a more sophisticated method that produces smoother edges than bilinear interpolation. Here, a new pixel is a bicubic function using 16 pixels in the nearest 4 x 4 neighborhood of the pixel in the original image. This is the method most commonly used by image editing software, printer drivers and many digital cameras for resampling images.
- *Box Average (3x3, 4x4, 5x5, and 7x7)* - the box average methods simply find the average values of the nearest 9 (for 3x3), 16 (for 4x4), 25 (for 5x5), or 49 (for 7x7) pixels and use that as the value of the sample location. These methods are very good for resampling data at lower resolutions. The lower the resolution of your export is as compared to the original, the larger "box" size you should use.
- *Box Maximum (3x3, 4x4, and 5x5)* - the box maximum methods simply find the maximum value of the nearest 9 (for 3x3), 16 (for 4x4), 25 (for 5x5), or 49 (for 7x7) pixels and use that as the value of the sample location. These methods are very good for resampling elevation data at lower resolutions so that your new terrain surface has the maximum elevation value rather than the average (good for terrain avoidance). This method behaves the same as the average on raster/imagery layers. The lower the resolution of your export is as compared to the original, the larger "box" size you should use.

The *Texture Map* option allows a 2D raster overlay to be draped over loaded 3D elevation overlays. Selecting the check box causes the overlay to use any available data from underlying elevation layers to determine how to color the DRG or DOQ. The result is a shaded relief map.

Color/Contrast Adjustment Tab

The Color/Contrast Adjustment tab (pictured below) allows you to control the color balance and contrast of the selected overlay(s).



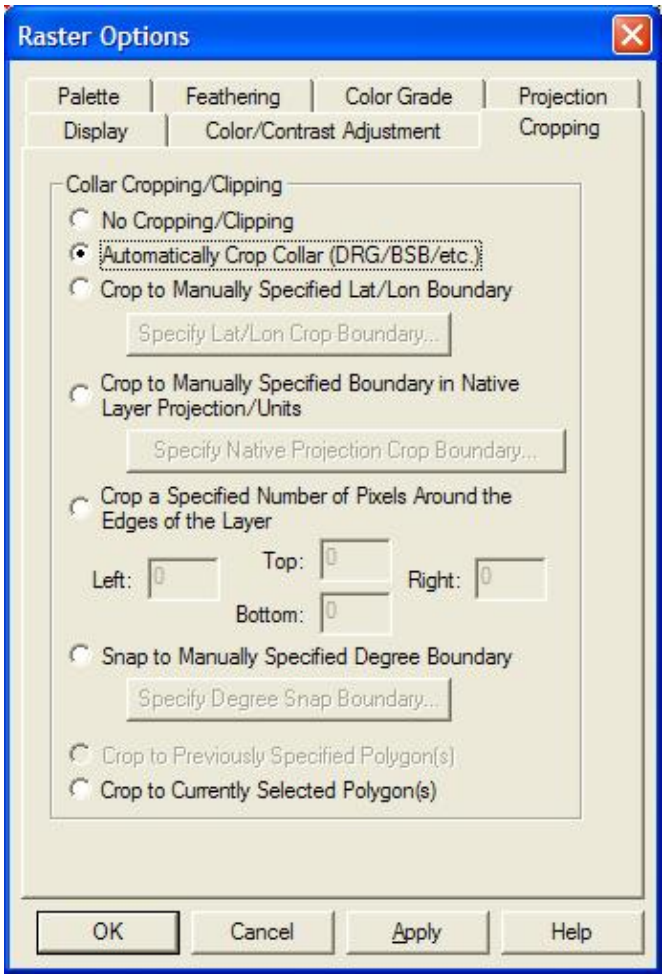
The *Color Balance* sliders allow you modify the relative amounts of red, green, and blue in the image, thus allowing precise control over the color balance in the image.

The *Contrast Adjustment* options are used to adjust the contrast of imagery. The *Linear (Percentage Stretch)* contrast adjustment method applies a standard deviation contrast adjust to each color channel in the image. You can specify how many standard deviations from the mean that the range is stretch to for rendering, although you'll generally want to stick with the default of 2. This is particularly useful for improving the display of dark or satellite imagery, such as IKONOS images, and is required for the display of imagery with more than 8 bits per color channe. The *Linear (Min/Max Stretch)* method finds the minimum and maximum values in each color channel and stretches that range to a range of 0 to 255. For most imagery with 8 bits or less per color channel this will have no effect, but can produce a good result for high-color imagery.

The *Share Contrast Adjustment with Other Layers* checkbox allows you to specify that the calculated contrast adjustment used should be based on all loaded raster layers that have contrast adjustment enabled rather than just the color histogram for this single layer. This is enabled by default and provides consistent results when adjusting the contrast for multiple mosaiced images.

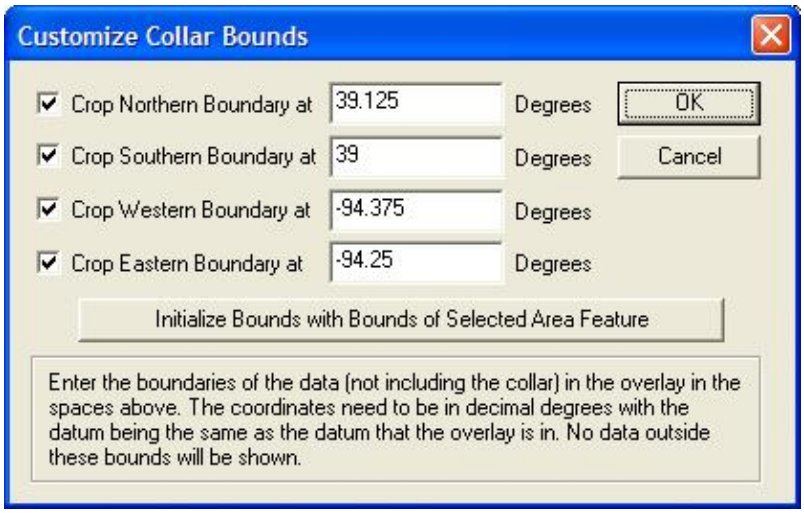
Cropping Tab

The Cropping tab (pictured below) allows you to crop the selected overlay(s) to a particular boundary, including support for automatically removing the collars from USGS DRG topographic maps.



The *Automatically Crop Collar (DRG/BSB/etc.)* option is used to automatically remove the collar from loaded raster data if the collar is in a recognized format. Most frequently it is used to removes the white border around a DRG, the small black collar around a 3.75 minute DOQQ, or the map collar around a BSB marine chart. This allows you to seamlessly view a collection of adjacent BSB, DRG, or DOQQ files.

The *Crop to Manually Specified Lat/Lon Boundary* option allows you to specify a lat/lon boundary (in the native datum of the selected overlay) to crop the overlay to. When selected, this option will display the Customize Collar Bounds dialog (pictured below) to allow specifying the bounds to crop to.


Customize Collar Bounds
Crop Northern Boundary at
39.125
Degrees
OK
Crop Southern Boundary at
39
Degrees
Cancel
Crop Western Boundary at
-94.375
Degrees
Crop Eastern Boundary at
-94.25
Degrees
Initialize Bounds with Bounds of Selected Area Feature
Enter the boundaries of the data (not including the collar) in the overlay in the spaces above. The coordinates need to be in decimal degrees with the datum being the same as the datum that the overlay is in. No data outside these bounds will be shown.

The *Crop to Manually Specified Boundary in Native Layer Projection/Units* option allows you to specify a crop boundary in the native units of the selected overlay. When selected, this option will display the Customize Collar Bounds dialog (pictured above) to allow specifying the bounds to crop to.

The *Crop a Specified Number of Pixels Around the Edges of the Layer* option allows you to specify a number of pixels to crop of each edge of the selected overlay(s).

The *Snap to Manually Specified Degree Boundary* option allows you to specify that the collar for the selected overlay will be on some degree boundary, like an even degree, of 0.5 degrees, etc. This way you can setup cropping for a collection of maps that are all similarly aligned.

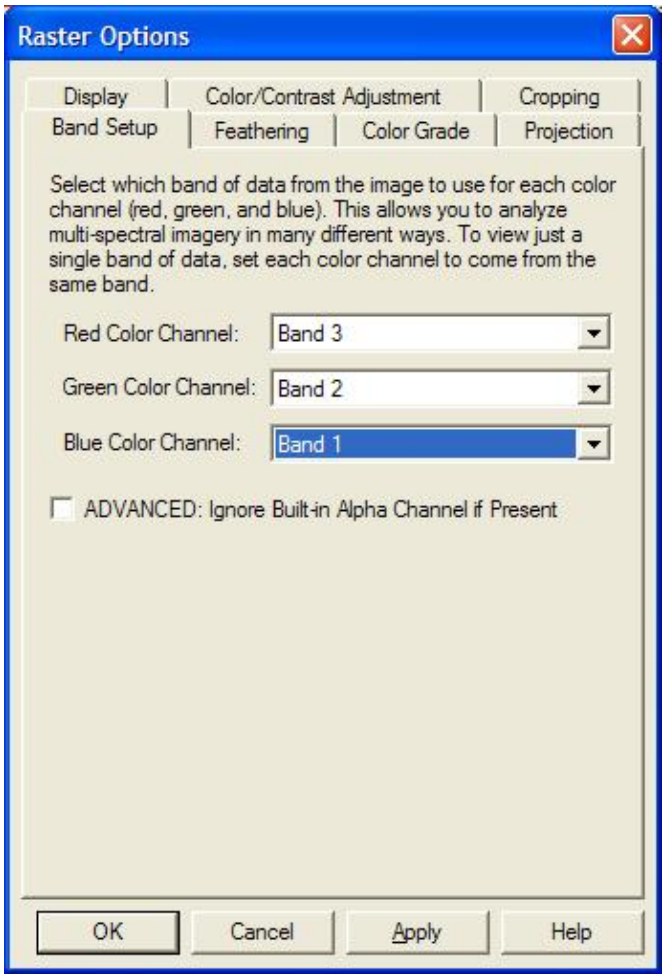
The *Crop to Previously Selected Polygon(s)* option specifies that you want to crop to the crop polygon(s) (area) previously applied to the selected layer(s) using the *Crop to Currently Selected Polygon* option.

The *Crop to Currently Selected Polygon(s)* option specifies that you want to crop the selected layer(s) to any area feature(s) currently selected with either the Feature Info or Digitizer Tools.

Band Setup Tab

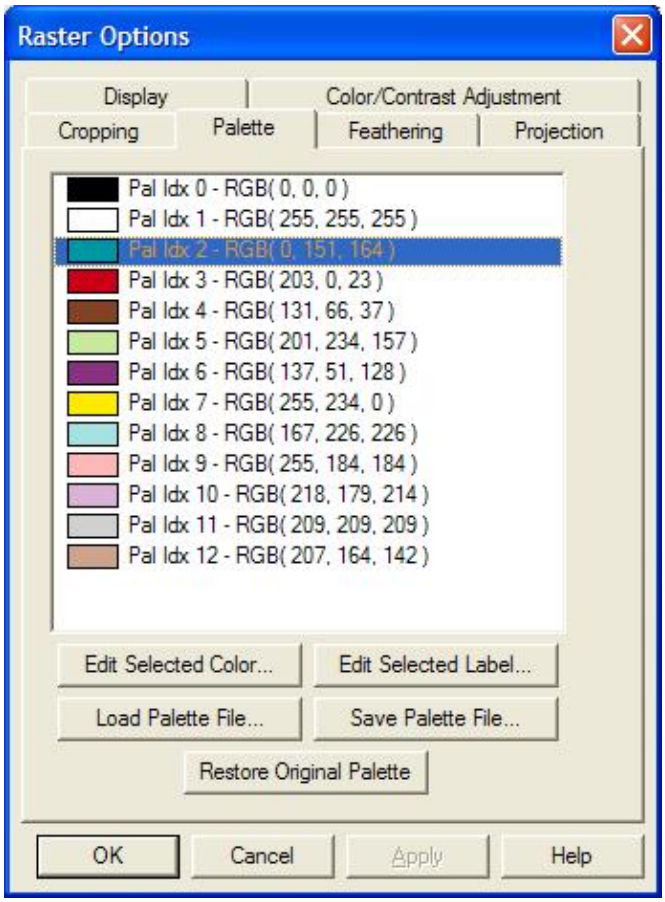
The Band Setup tab (pictured below) is available for some types of imagery with 3 or more bands of data. This tab allows you to control which bands of data are used for the red, green, and blue color bands. This is a very useful tool when trying to extract different types of information out of multi-spectral imagery.

There is also an option for advanced users to allow disabling of the alpha (translucency) channel for an image. This is useful if you have an image with bad alpha values (like all set to completely transparent) and you just want to see the colors without applying the alpha values.


Raster Options
Display
Color/Contrast Adjustment
Cropping
Band Setup
Feathering
Color Grade
Projection
Select which band of data from the image to use for each color channel (red, green, and blue). This allows you to analyze multi-spectral imagery in many different ways. To view just a single band of data, set each color channel to come from the same band.
Red Color Channel:
Band 3
Green Color Channel:
Band 2
Blue Color Channel:
Band 1
ADVANCED: Ignore Built-in Alpha Channel if Present
OK
Cancel
Apply
Help

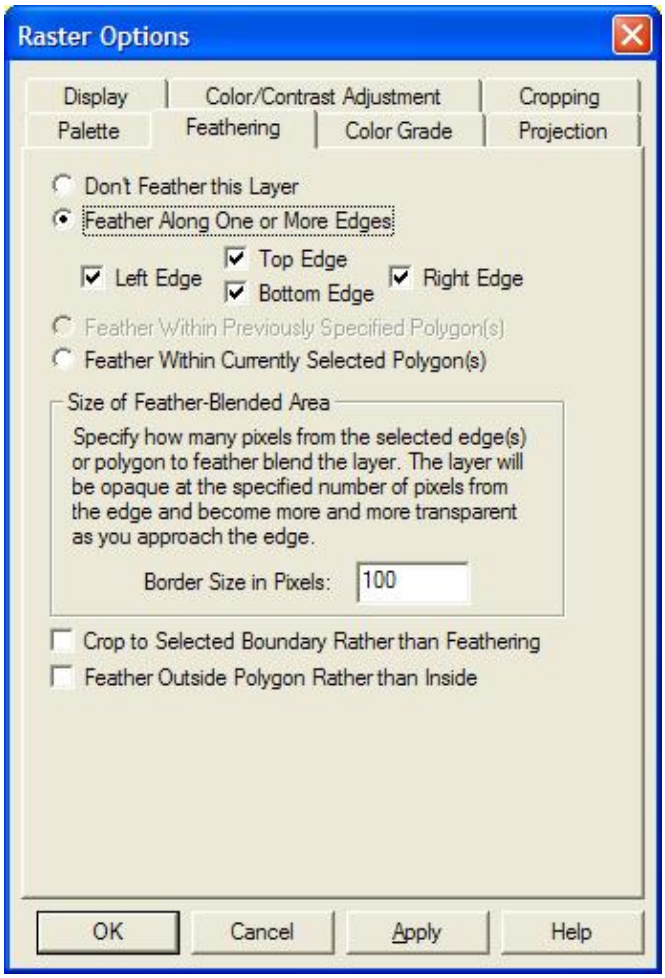
Palette Tab

The Palette tab (pictured below) is available for raster image files that use a fixed color palette for display. This tab allows you to see what colors are in the palette as well as edit the color and/or description of each color in the palette. This allows you to easily replace one color with another. You can also save the palette to a new file or load an entirely new palette to use for the layer from an existing .PAL or .CLR file.

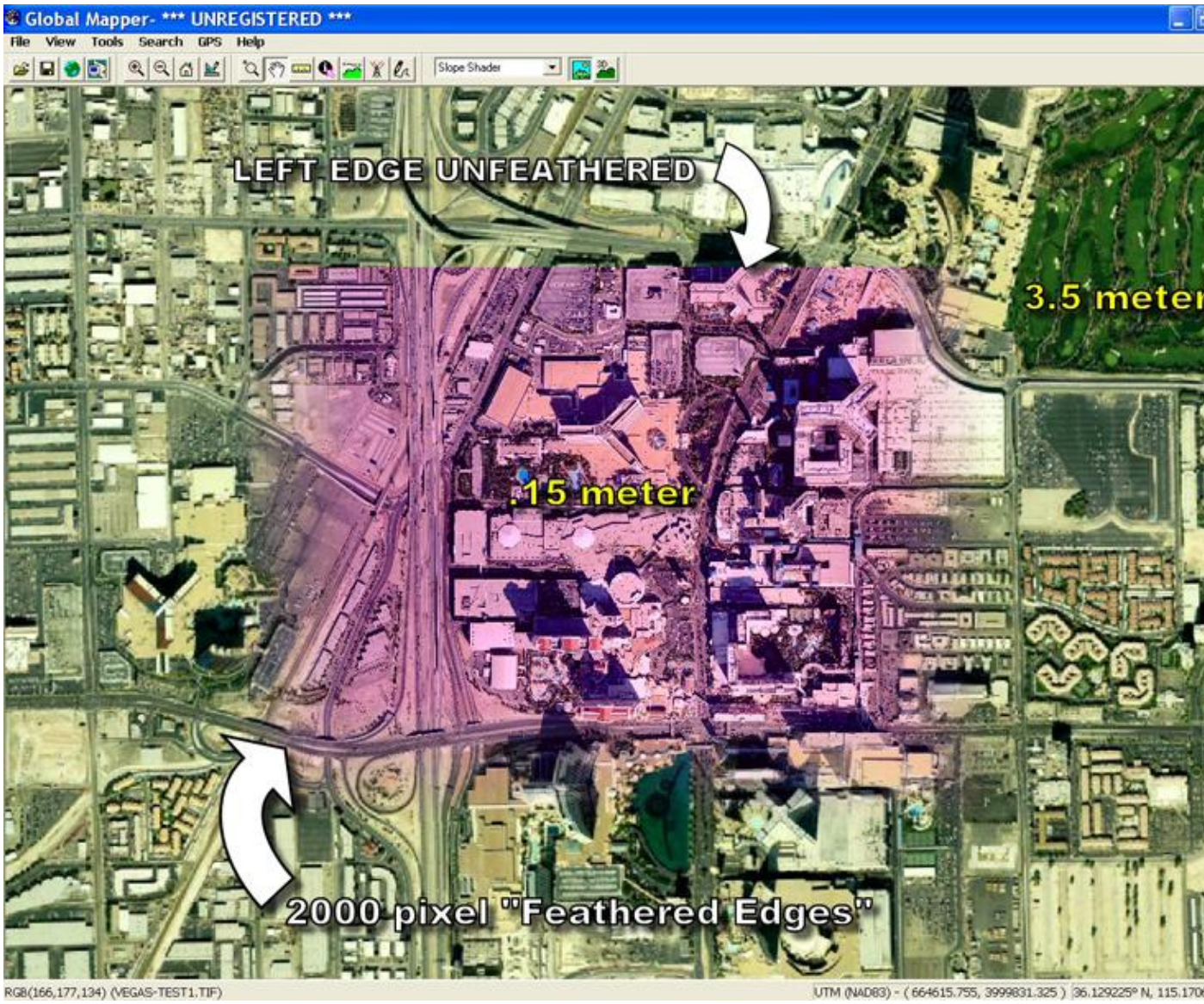

Raster Options
Display
Color/Contrast Adjustment
Cropping
Palette
Feathering
Projection
Pal Idx 0 - RGB(0, 0, 0)
Pal Idx 1 - RGB(255, 255, 255)
Pal Idx 2 - RGB(0, 151, 164)
Pal Idx 3 - RGB(203, 0, 23)
Pal Idx 4 - RGB(131, 66, 37)
Pal Idx 5 - RGB(201, 234, 157)
Pal Idx 6 - RGB(137, 51, 128)
Pal Idx 7 - RGB(255, 234, 0)
Pal Idx 8 - RGB(167, 226, 226)
Pal Idx 9 - RGB(255, 184, 184)
Pal Idx 10 - RGB(218, 179, 214)
Pal Idx 11 - RGB(209, 209, 209)
Pal Idx 12 - RGB(207, 164, 142)
Edit Selected Color...
Edit Selected Label...
Load Palette File...
Save Palette File...
Restore Original Palette
OK
Cancel
Apply
Help

Feathering Tab

The Feathering tab (pictured below) allows you specify that you would like to feather-blend the selected overlay(s) with the underlying overlay(s) on the specified edges. This can be extremely powerful tool for blending imagery/maps from different sources and/or at different resolution to make the edge between the map sets invisible. You can choose to either feather-blend around the edges of selected files or along the boundary of one or more selected polygons. Feather blending can be used on both raster (imagery) layers as well as gridded elevation layers. In the case of elevation layers, the feather blending works by calculating modified elevation values based on elevation value in the blended layer and the topmost elevation layer underneath the blended layer in the draw order.

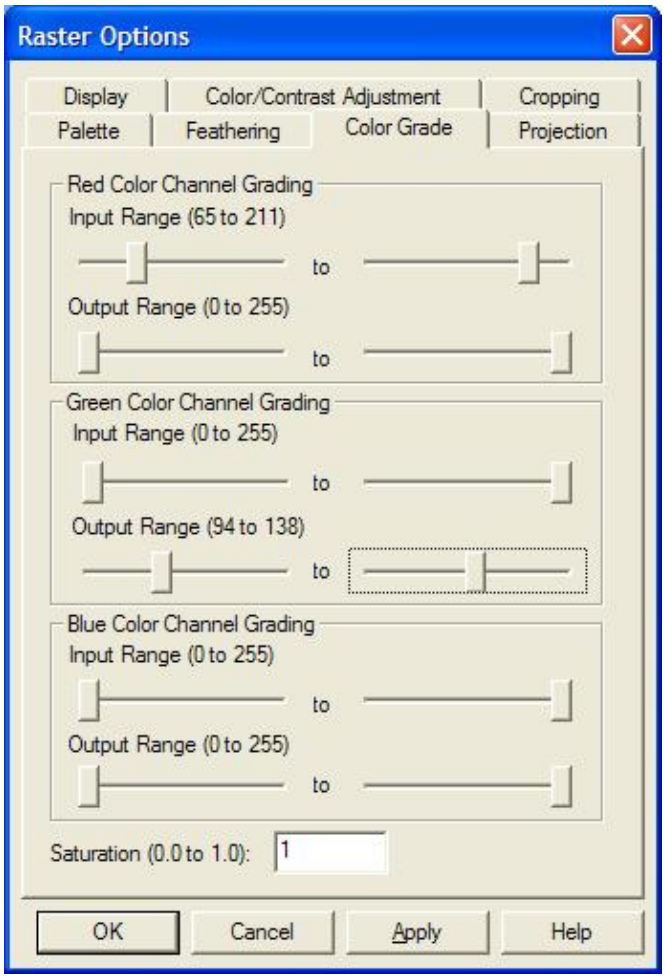

Raster Options
Display
Color/Contrast Adjustment
Cropping
Palette
Feathering
Color Grade
Projection
Don't Feather this Layer
Feather Along One or More Edges
Left Edge
Top Edge
Bottom Edge
Right Edge
Feather Within Previously Specified Polygon(s)
Feather Within Currently Selected Polygon(s)
Size of Feather-Blended Area
Specify how many pixels from the selected edge(s) or polygon to feather blend the layer. The layer will be opaque at the specified number of pixels from the edge and become more and more transparent as you approach the edge.
Border Size in Pixels:
100
Crop to Selected Boundary Rather than Feathering
Feather Outside Polygon Rather than Inside
OK
Cancel
Apply
Help

The screenshot below displays the results of feather-blending a very high resolution data set (0.15 meters per pixel) with a lower resolution (3.5 meters per pixel) dataset to remove the edge. Note that the higher resolution image has been purposely tinted violet to make the effect more obvious.



Color Grade Tab

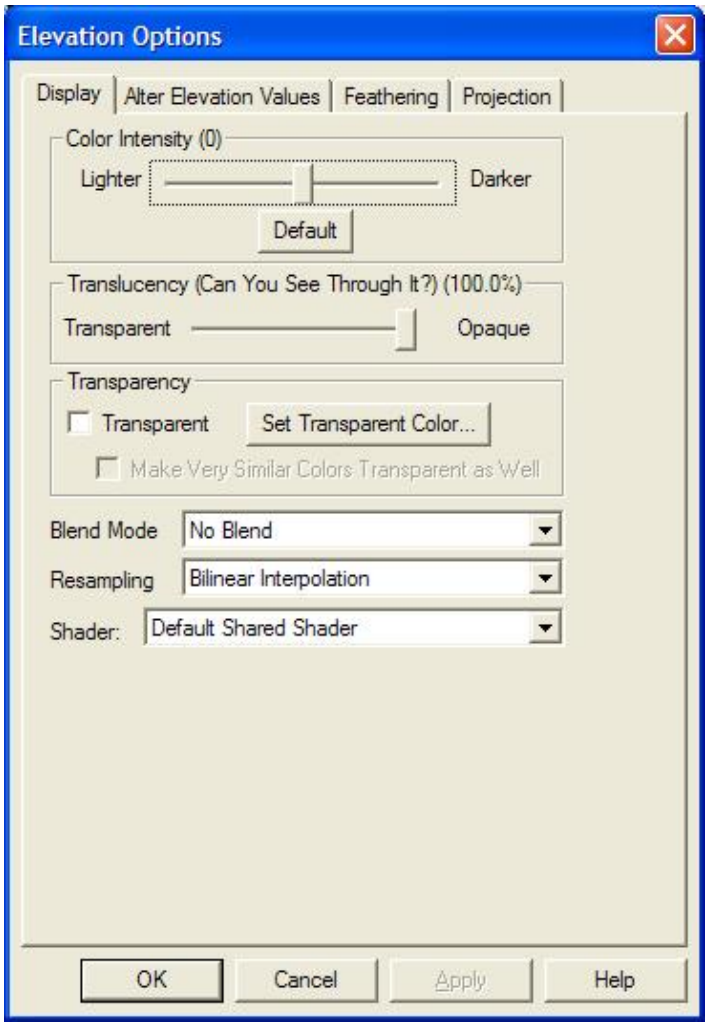
The Color Grade tab (pictured below) allows you to apply complex color correction to a loaded raster file. You can setup the input range for each color channel and what output range to map it to, as well as specify a saturation value.



Elevation Data Options

Selecting the *Options...* button while only gridded elevation overlays are selected displays the Elevation Options dialog. The Elevation Options dialog consists of two tabs, one for controlling the display of the overlay(s) and the other for modifying the elevation values within the overlay(s).

The Display tab (pictured below) contains controls allowing you to control the color intensity (brightness/darkness), color transparency, blending, anti-aliasing, and color shading of the selected layers.



The *Color Intensity* setting controls whether displayed pixels are lightened or darkened before being displayed. It may be useful to lighten or darken raster overlays in order to see overlaying vector data clearly.

The *Translucency* setting controls to what degree you can see through the overlay to overlays underneat the overlay. The default setting of Opaque means that you cannot see through the overlay at all. Settings closer to Transparent make the overlay increasingly more see-through, allowing you to blend overlapping data.

The *Blend Mode* setting controls how an overlay is blended with underlying overlays, in addition to the *Translucency* setting. These settings allow Photoshop-style filters to be applied to overlays, resulting in often stunning results. What you get from a particular set of overlays from a particular blend mode setting can often be hard to predict, so rather than try to understand what is technically happening for each blend mode it's best to just experiment with different ones until you find one that you like. The Hard Light setting seems to work well with satellite imagery overlaid on DEMs, but the others can be quite useful as well.

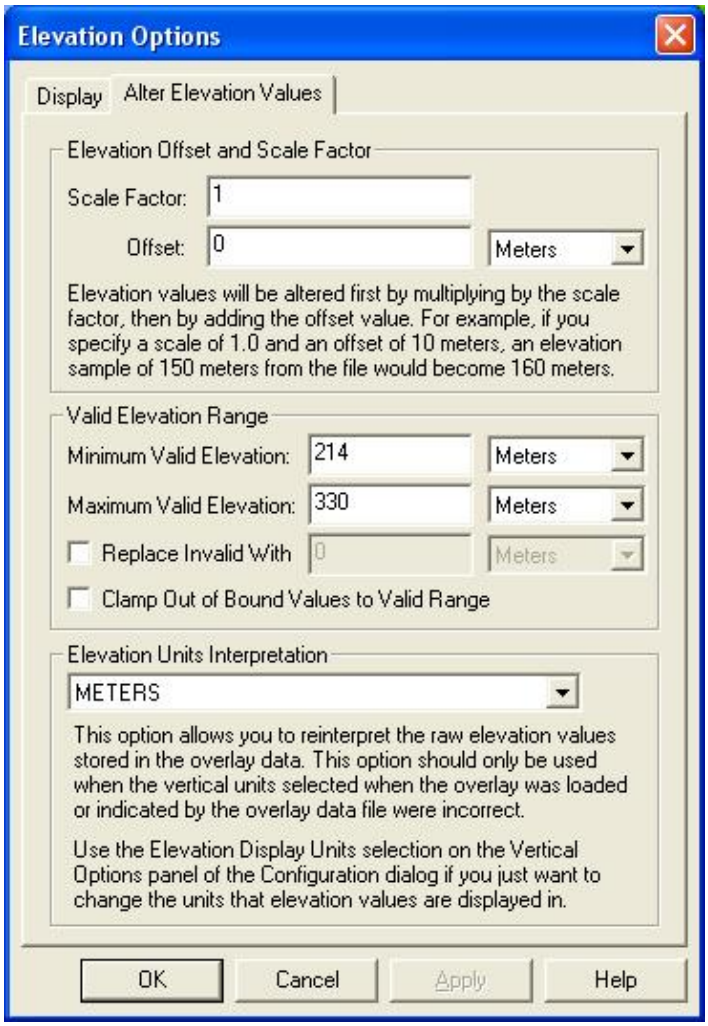
The *Transparent* option allows a particular color to be displayed transparently, making it possible to see through a layer to the layers underneath. For example, when viewing a DRG on top of a DOQ, making the white in the DRG transparent makes it possible to see much of the DOQ underneath. Pressing the *Set Transparent Color...* button allows the user to select the color to treat as transparent in the selected overlay.

The *Resampling* option allows you to control how the elevation value for each displayed/export location is determined based on the values in the file. The following resampling methods are supported:

- *Nearest Neighbor* - simply uses the value of the sample that a location is in. When resampling or reprojected an image this can result in a stair-step effect, but will maintain exactly the original elevation values of the source file.
- *Bilinear Interpolation* - determines the value of a new sample based on a weighted average of the 4 samples in the nearest 2 x 2 neighborhood of the sample in the original image. The averaging has an anti-aliasing effect and therefore produces relatively smooth edges with hardly any jaggies.
- *Bicubic Interpolation* - a more sophisticated method that produces smoother edges than bilinear interpolation. Here, a new pixel is a bicubic function using 16 samples in the nearest 4 x 4 neighborhood of the sample in the original image.
- *Box Average (3x3, 4x4, 5x5, and 7x7)* - the box average methods simply find the average values of the nearest 9 (for 3x3), 16 (for 4x4), 25 (for 5x5), or 49 (for 7x7) samples and use that as the value of the sample location. These methods are very good for resampling data at lower resolutions. The lower the resolution of your export is as compared to the original, the larger "box" size you should use.

The *Shader* option allows you to choose which elevation shader is to be used for coloring the cell values within this layer. By default, all gridded layers will share the elevation shader selected on the toolbar, but there may be certain situations where you want to color one layer differently than the others and exclude it from the loaded elevation range. One common example is a gridded layer that actually has non-elevation data.

The Alter Elevation Values tab (pictured below) allows you to modify how elevation values from the selected layer(s) are interpreted, providing you a means to offset all of the elevations in the layer(s) by a given value and to restrict the range of elevation values that are treated as valid.


Elevation Options
Display
Alter Elevation Values
Elevation Offset and Scale Factor
Scale Factor:
1
Offset:
0
Meters
Elevation values will be altered first by multiplying by the scale factor, then by adding the offset value. For example, if you specify a scale of 1.0 and an offset of 10 meters, an elevation sample of 150 meters from the file would become 160 meters.
Valid Elevation Range
Minimum Valid Elevation:
214
Meters
Maximum Valid Elevation:
330
Meters
Replace Invalid With
0
Meters
Clamp Out of Bound Values to Valid Range
Elevation Units Interpretation
METERS
This option allows you to reinterpret the raw elevation values stored in the overlay data. This option should only be used when the vertical units selected when the overlay was loaded or indicated by the overlay data file were incorrect.
Use the Elevation Display Units selection on the Vertical Options panel of the Configuration dialog if you just want to change the units that elevation values are displayed in.
OK
Cancel
Apply
Help

Show/Hide Overlay(s)

Toggles whether the currently selected overlays are visible. You can also use the checkboxes next to each layer to control the visible state of the overlays.

Close Overlay(s)

Closes all the currently selected overlays.

3D View Menu Command

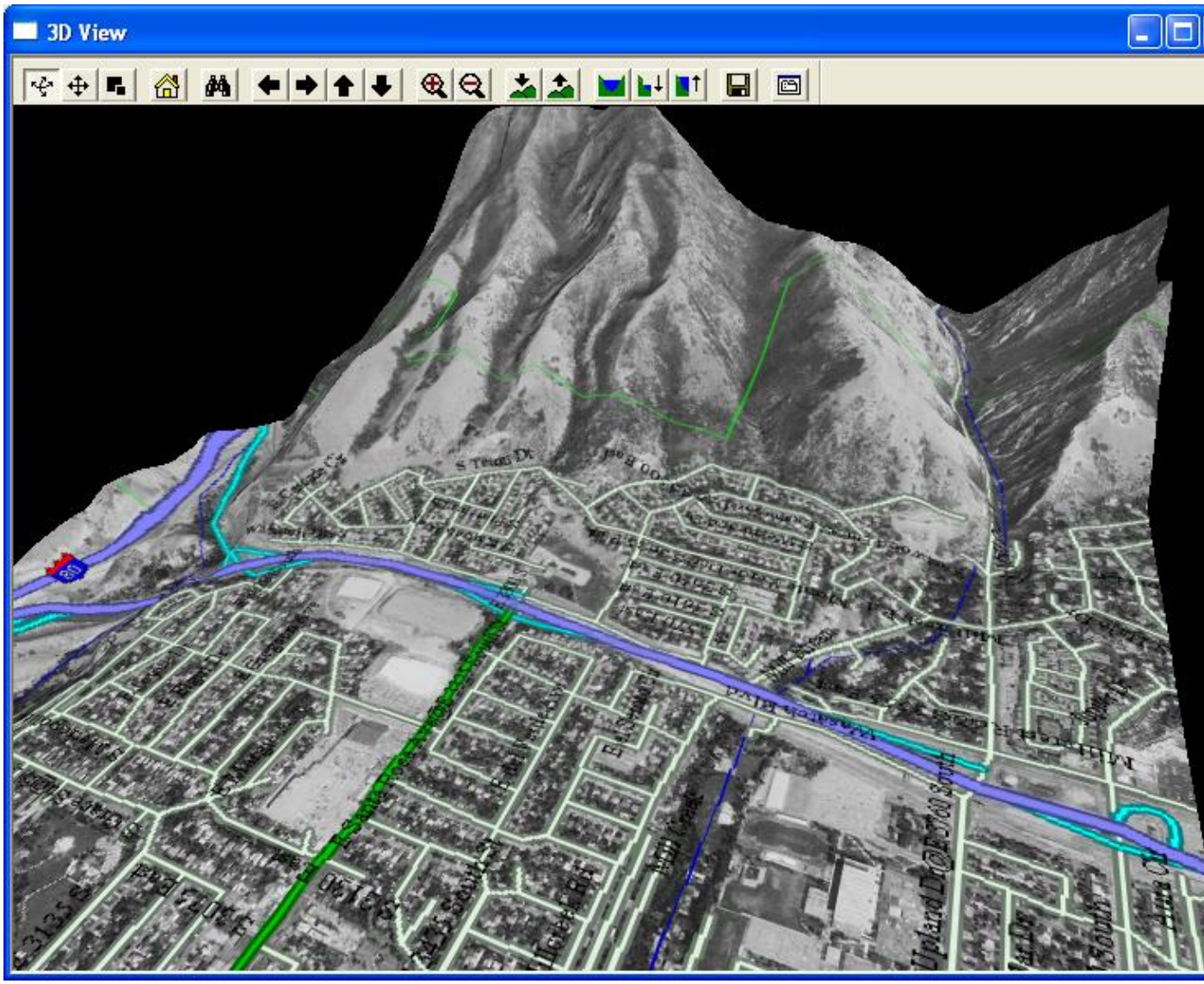
The 3D View command in *Global Mapper* allows registered users to view gridded elevation data and any overlying raster or vector data in a true perspective 3D manner. In addition, any vector data with associated elevation values can also be displayed in true 3D.

VIDEO TUTORIAL ALERT!

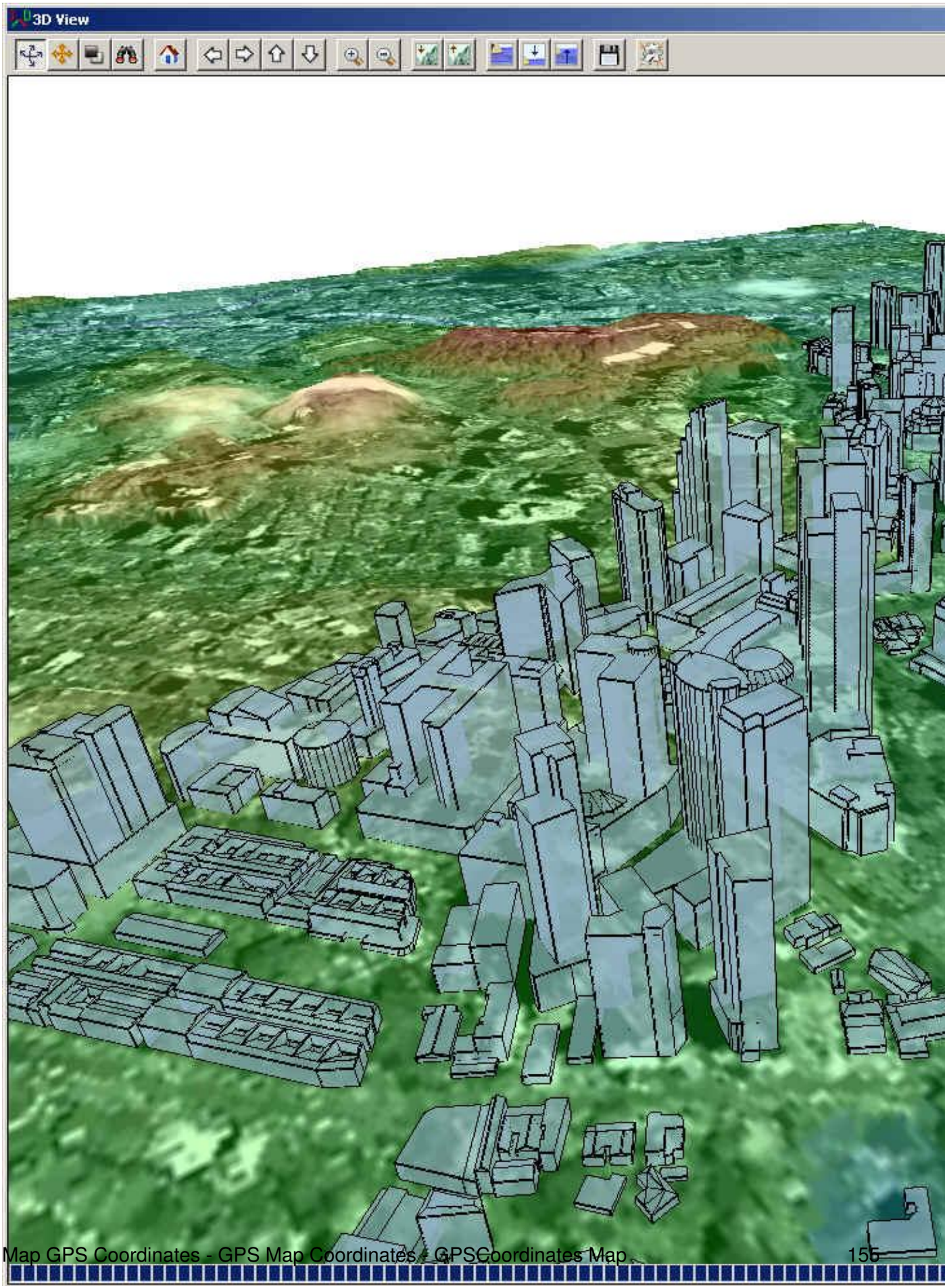
- Video Tutorial - Viewing 3D Vector Data
- Video Tutorial - Creating a Custom 3D Map

When selected, the **3D View** command displays a window containing a 3D view of the data in the current *Global Mapper* view. Any imagery or vector data being drawn on top of the elevation grid(s) in the main *Global Mapper* view will automatically be draped on top of the elevation data in the 3D View window. If so configured, any 3D vector data will be displayed in space as well.

The image below depicts a sample of the 3D View window displayed using 250K USGS DEM data for Salt Lake City, UT overlaid with DOQ satellite imagery from the TerraServer import command under the File menu.

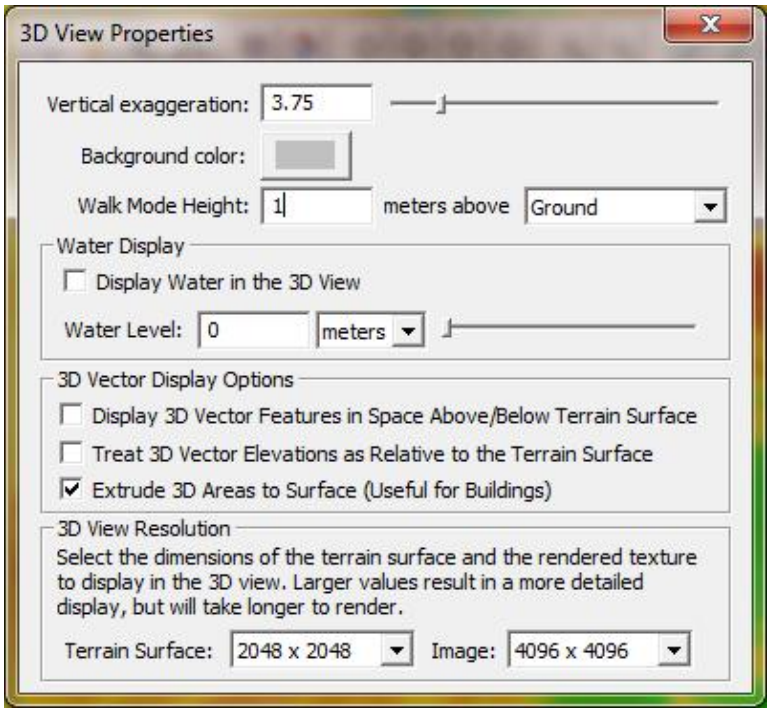


The image below depicts a sample of the 3D View window displaying terrain data with 3D building areas for Kuala Lumpur, Malaysia.


3D View

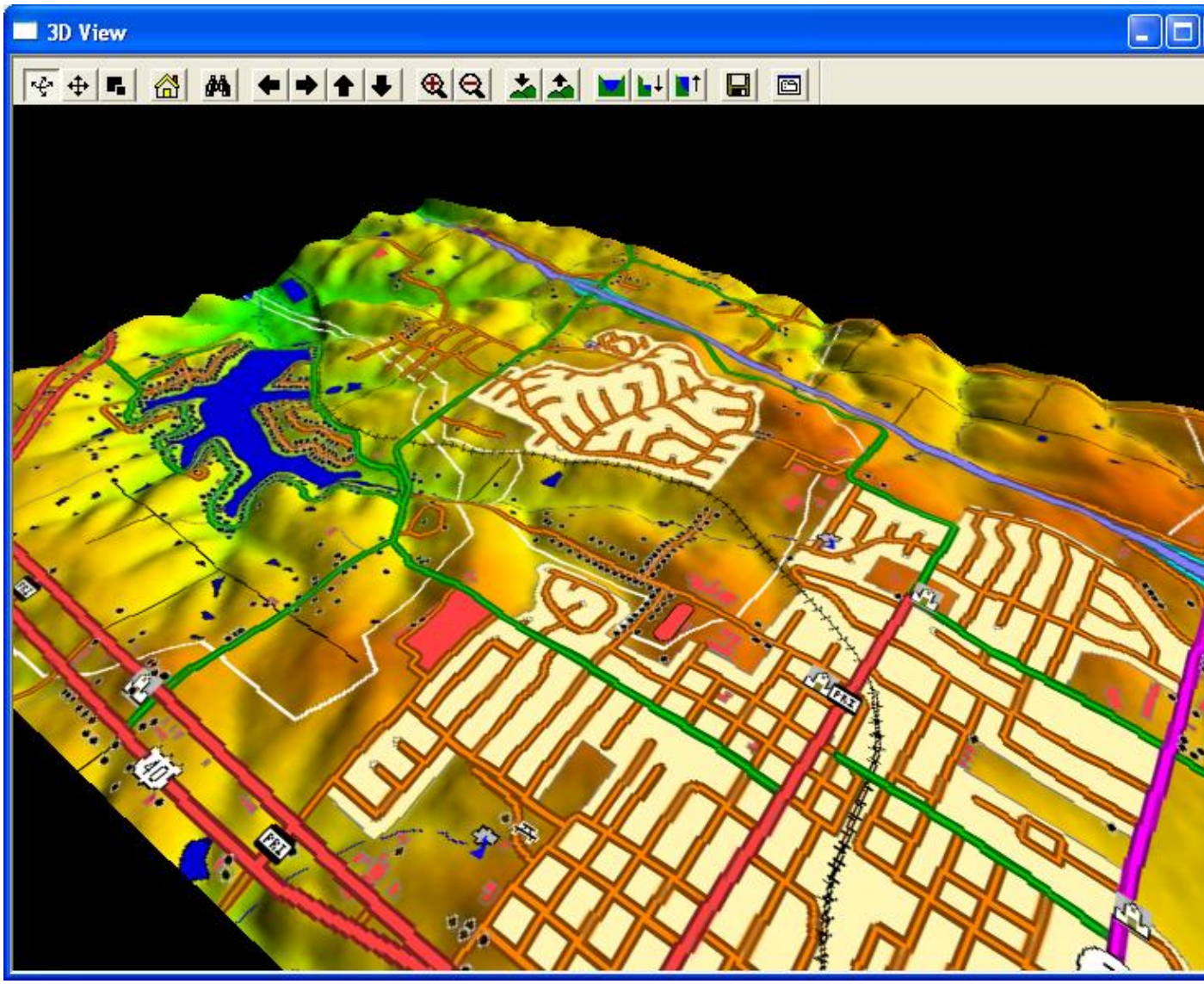
The 3D View window contains a toolbar with command buttons allowing you to modify the default view. You can use the mouse to rotate the view around as well as zoom in. The arrow keys on the toolbar allow you to pan the data visible in the 3D view in any direction. The zoom in and out buttons allow you to zoom in or out on the center of the 3D view. Additional buttons are also available for modifying the vertical exaggeration, displaying water, and saving the 3D view contents to a Windows BMP, TIFF, PNG, or JPG file.

If you press the *Change Display Properties* button on the 3D toolbar the *3D View Properties* dialog is displayed allowing you to configure the 3D view settings, including the vertical exaggeration, the water display, background color, 3D vector display, as well as the terrain and draped image resolution.


3D View Properties
Vertical exaggeration: 3.75
Background color:
Walk Mode Height: 1 meters above Ground
Water Display
Display Water in the 3D View
Water Level: 0 meters
3D Vector Display Options
Display 3D Vector Features in Space Above/Below Terrain Surface
Treat 3D Vector Elevations as Relative to the Terrain Surface
Extrude 3D Areas to Surface (Useful for Buildings)
3D View Resolution
Select the dimensions of the terrain surface and the rendered texture to display in the 3D view. Larger values result in a more detailed display, but will take longer to render.
Terrain Surface: 2048 x 2048
Image: 4096 x 4096

The contents of the 3D View window will always reflect what is visible in the main *Global Mapper* view. This means that as you pan and zoom around the main *Global Mapper* view, the contents of the 3D View window will pan and zoom around as well. The reverse is also true in that the pan and zoom buttons on the 3D View window will cause the main *Global Mapper* view to pan and zoom as well.

Another example of the 3D view is displayed below. This time, it is several 24K USGS DLGs for Blue Springs, MO overlaid on several 24K USGS DEMs for the same area.



3D Vector Display - Advanced Discussion and Options

3D vector data is exaggerated along with the terrain so it will align correctly. A bridge going over a gorge with heights of 100m and 110m on either end wouldn't match up with the terrain heights of 100m and 110m if both weren't exaggerated. If relative elevations of 0m and 10m are used, those would end up as 0m and 30m which would still allow the bridge to match up (NOTE: these values assume a vertical exaggeration value of 3.0).

When extruding to the surface, the default base of the extrusion is set just below the minimum elevation, so your extruded areas should always extend through the terrain surface.

You can provide additional control over how 3D vector features are rendered by provided attributes for those features. The supported attributes are as follows:

- 3D_EX_HT - the value of this attribute allows you to override the default extrusion height and extrude just that height in meters

- 3D_ZOFFSET - the value of this attribute allows you to provide an additional offset (in meters) when rendering a 3D vector feature

Tools Menu

The *Tools Menu* offers the following commands:

- Zoom - Allows the user to zoom in on a specific point in the display.
- Pan (Grab-and-Drag) - Drag the view to a new location.
- Measure - Measures length as well as an enclosed area.
- Feature Info - Chooses an object to display its attributes.
- Path Profile/LOS - Generate 3D path profile and perform line of sight (LOS) calculations
- View Shed Analysis - Perform view shed analysis using loaded elevation grid data
- Digitizer - Modify existing vector features and create new ones.
- Coordinate Convertor - Easy reprojection/conversion of coordinates
- Control Center - Central control for all loaded overlays.
- Configure - General Global Mapper setup.
- Map Layout - Setup Map Layout Display (scale bar, margins, north arrow, etc.)

Zoom Tool

The *Zoom* command selects the zoom tool as the current tool.

To zoom in on a specific point, choose the [Zoom tool] from the toolbar or, [Tool/Zoom] from menu bar. A magnifying glass icon should appear on the screen. To zoom in, left click without dragging the mouse. The view is centered on where the mouse was clicked and will zoom in by a factor of two. To zoom out, right click without dragging the mouse. The view will zoom out by a factor of two, centered on where the mouse was clicked. You can also hold down the Ctrl key while right clicking to restore the view to the last zoomed view.

Alternately, one can zoom in to a user-defined rectangle by left clicking and then draging a box while holding down the left mouse button.

If your mouse has a middle button, you can hold it down and drag the map similar to the behavior of the Pan (Grab-and-Drag) tool.

Pan (Grab-and-Drag) Tool

The Pan (Grab-and-Drag) command selects the Pan tool as the current tool.

To change the center point of the image without changing the magnification, depress the left mouse button, drag the view to the desired location, then release the left mouse button to redraw the view at the new location.

If you just want to recenter on a new location without dragging, just click the left mouse button at the new desired location and the view will be recentered on that location (this provides the functionality of the old Recenter Tool).

Measure Tool

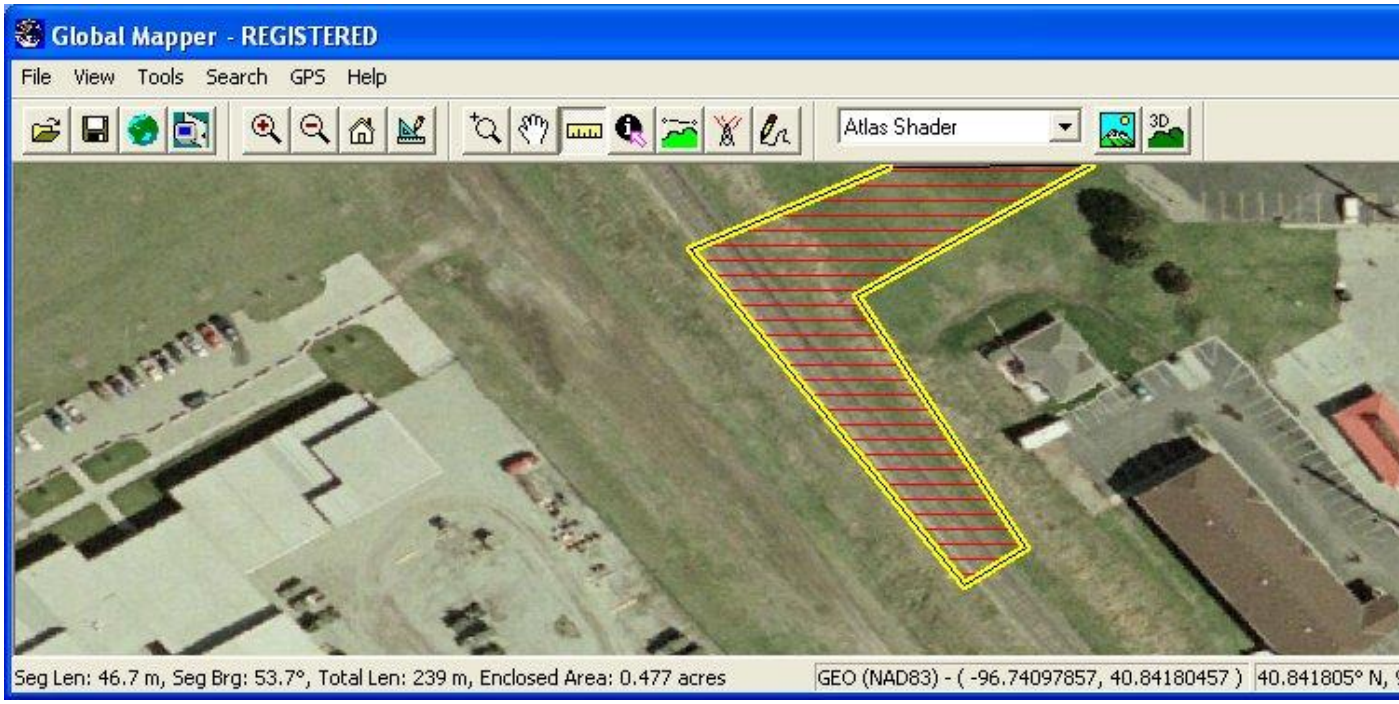
The Measure command selects the measure tool as the current tool.

To find the distance between along a path on the display or the enclosed area of a set of points, choose the [Measure Tool] icon from the toolbar or select [Tools/Measure] from the menu bar.

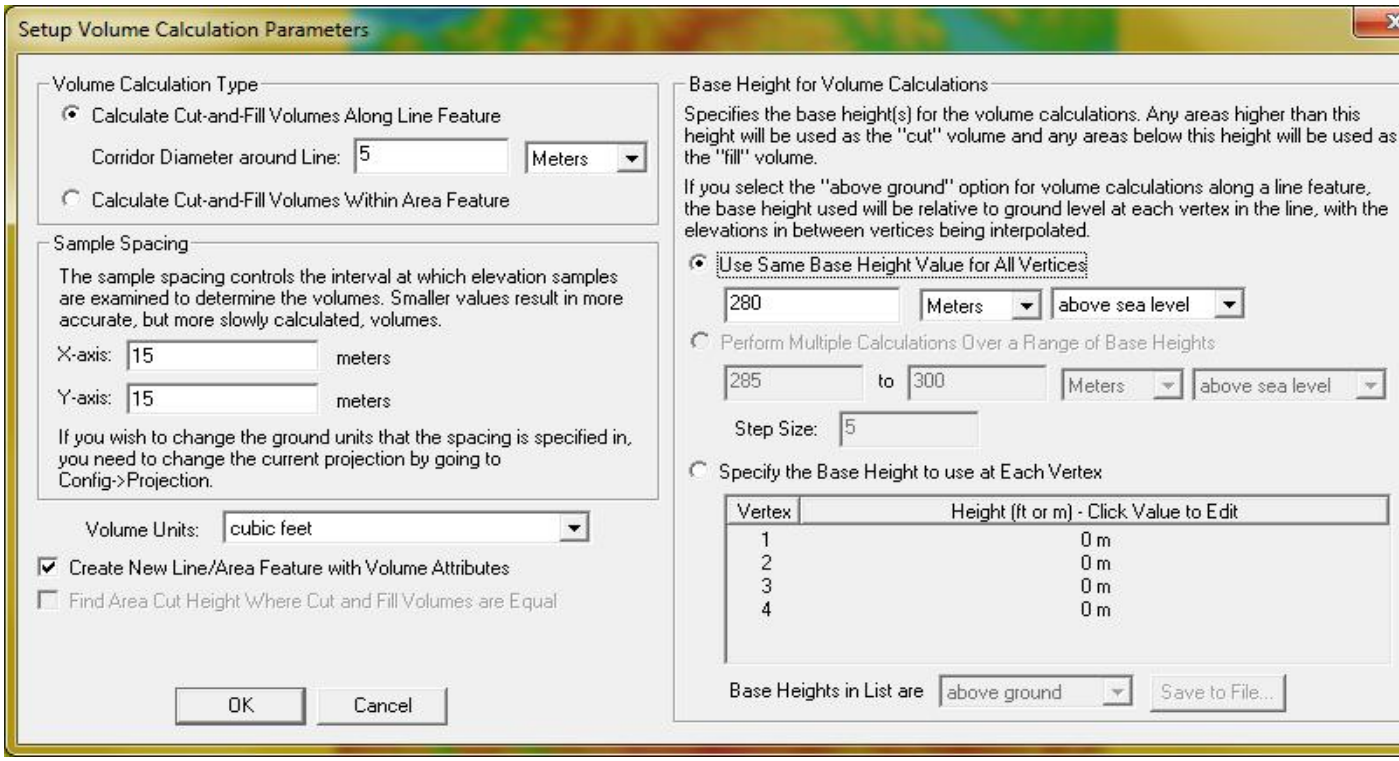
1. Left click on the point to begin the measurement. Move the mouse, which will draw a line, to the point where the measurement should stop.
2. Repeat step 1 until you have defined the entire path or area that you wish to measure.
3. Right click the right mouse button and select "Stop Measuring" from the list using a left click. Notice that "Stop Measuring" and "Close polygon" choices are now grayed out. The measurement(s) will be displayed on the left side of the status bar below.
4. In order to change measurements right click and choose a new unit using a left click. You may continue to change the measurement display by selecting different units. The distance will be displayed in kilometers, meters, miles or feet for a line, and in square feet, square meters, square miles, acres, or hectares for areas.

Note that if you place a point along your measurement that you do not want you can press Ctrl+Z to remove the last placed point in the measurement.

You can also save a measurement to a separate feature by right clicking and selecting "Save Measurement" from the list that pops up. You can then export these measurements to new vector files, such as Shapefiles or DXF, or modify them with the Digitizer Tool. There is also an option to copy the measurement text to the clipboard when you right-click.


Global Mapper - REGISTERED
File View Tools Search GPS Help
Atlas Shader
3D
Seg Len: 46.7 m, Seg Brg: 53.7°, Total Len: 239 m, Enclosed Area: 0.477 acres
GEO (NAD83) - (-96.74097857, 40.84180457)

If you have gridded elevation data loaded under the measurement, you can also calculate the *Cut-and-Fill* volume either within the measurement area or within some distance of the measurement line. To do this, simply right click then select the "Measure Volume (Cut-and-Fill)" option that appears. Selecting this option will display the *Setup Volume Calculation Parameters* dialog (pictured below), which allows you to set up the volume measurement.


Setup Volume Calculation Parameters
Volume Calculation Type
Calculate Cut-and-Fill Volumes Along Line Feature
Corridor Diameter around Line: 5
Meters
Calculate Cut-and-Fill Volumes Within Area Feature
Sample Spacing
The sample spacing controls the interval at which elevation samples are examined to determine the volumes. Smaller values result in more accurate, but more slowly calculated, volumes.
X-axis: 15 meters
Y-axis: 15 meters
If you wish to change the ground units that the spacing is specified in, you need to change the current projection by going to Config->Projection.
Volume Units: cubic feet
Create New Line/Area Feature with Volume Attributes
Find Area Cut Height Where Cut and Fill Volumes are Equal
OK
Cancel
Base Height for Volume Calculations
Specifies the base height(s) for the volume calculations. Any areas higher than this height will be used as the "cut" volume and any areas below this height will be used as the "fill" volume.
If you select the "above ground" option for volume calculations along a line feature, the base height used will be relative to ground level at each vertex in the line, with the elevations in between vertices being interpolated.
Use Same Base Height Value for All Vertices
280
Meters
above sea level
Perform Multiple Calculations Over a Range of Base Heights
285
to
300
Meters
above sea level
Step Size: 5
Specify the Base Height to use at Each Vertex
Vertex
Height (ft or m) - Click Value to Edit
1 0 m
2 0 m
3 0 m
4 0 m
Base Heights in List are
above ground
Save to File...

On the *Setup Volume Calculate Parameters* you can select whether to measure cut-and-fill volumes within some specified distance of the selected line or within the specified area. If you are measuring along a line, you can specify the cut heights to use at each vertex individually or use the same cut (base) height for each vertex relative either to the ground at each vertex or relative to sea level. Whichever option you choose, the heights will be interpolated between line vertices to get a smoothly varying cut height. If measuring within an area, there is also an option to perform multiple cut-and-fill calculations between a range of cut (base) height values. If you choose this option the results will be displayed in a table at the end of the operation so you can see the results of each calculation.

Once you have your volume calculation setup and you press ok to calculate it, the volume of earth that would be needed to fill any space below the cut surface (fill volume) is reported along with the volume of earth that is above the cut surface (cut volume). After viewing the reported volumes, you have the option to save a new feature with the measurement values.

If measuring the cut-and-fill volumes within an area feature, you can also check the *Find Area Cut Height Where Cut and Fill Volumes are Equal* to find the approximate cut height where the same amount of dirt would have to be cut out as filled. This is useful for selecting a cut height at which no dirt needs to be hauled off or brought in. The optimal cut height will be reported as the break-even height with the other measurement results.

On the right-click menu in the Measure Tool are options to control how distances are measured and the paths are drawn. The following options are available:

- **Great Circle** - Any measured distances will use the great circle distance, which is the shortest path along the surface of the earth's ellipsoid between the two points. Any drawn paths will be along the great circle path. Typically you won't notice a difference for short distances, but will for longer ones.
- **Grid Distance** - Any measured distances will use the distance as calculated in the Cartesion XY

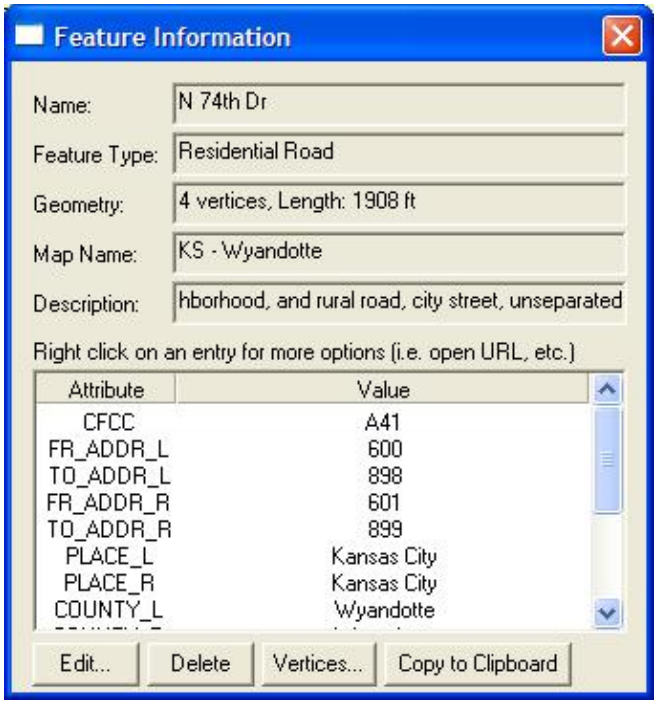
coordinate system of the current projected system. Any drawn paths will be straight lines between the start and end point. This can result in inaccurate distances for long measurements or when working in projection systems with high levels of distortion.

- **Rhumb Line** - Any measured distances will be drawn along the rhumb line if possible, which is a line of constant bearing between the start and end point. Rhumb lines are often used in navigation so that a constant bearing can be maintained. A rhumb line will be a straight line in the Mercator projection. Any drawn paths will also be along the shortest rhumb line path between the start and end point.

Feature Info Tool

The Feature Info command selects the Feature Information tool as the current tool. This tool allows you to select vector features (areas, lines, and points) by clicking on or near them. Once selected, a dialog displaying information about the selected item appears.

To pick objects, select the [Feature Info] icon from the Toolbar or select [Tools/Feature Info] from the menu bar. Press and release the left mouse button near the objects(s) to be picked. Holding down the 'P' key when left clicking causes only area features at the clicked location to be considered. If left-clicking on a picture point with an associated image, by default just the image will be displayed, but holding the Ctrl key when clicking will cause the normal feature info dialog to be displayed. When an object is picked, it will be highlighted and a feature info dialog (picture below) will be displayed. Right clicking the mouse button cycles through each of the elements located near the selection point, displaying the information in the dialog box.

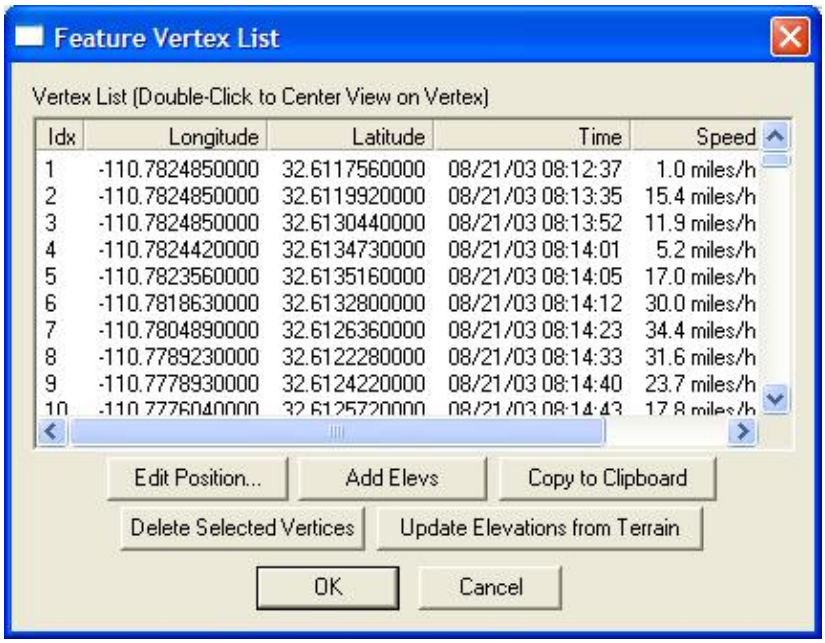


As you can see, you can view a lot of information about a selected object in the Feature Info dialog. The object's name, description, geometry information including length and enclosed area (when applicable), attribute value list, and map name, are all displayed. Buttons are also available allowing you to edit the selected feature's information and drawing style, marking the selected feature as deleted, as well as to copy all of the feature information (as text) and the feature itself to the Windows clipboard for pasting elsewhere, such as in a text editor or as a new feature in a running session of Global Mapper.

In addition, you can right click on any attribute value to see additional options specific to the selected attribute/value pair. You can copy the selected pair to the Windows clipboard, treat the value as a web URL and open that location in a web browser, or treat the value as a filename (either absolute or relative to the path of the source file from which the feature was read) and load that file either into Global Mapper or with the program associated with that file type in Windows. You can also choose to zoom the main map view to the extents of the selected feature.

If the selected feature has an attribute named IMAGE_LINK and the value of that attribute refers to a local image file, Global Mapper will automatically open that image in the associated application on your system, unless the Ctrl button was held down when you selected the feature. Likewise if you have an attribute named GM_LINK and the value of that attribute refers to a local file, Global Mapper will try and open that file in the current instance of Global Mapper as a new layer, unless the layer is already open or the Ctrl key was held down.

Clicking the *Vertices* button for line or area features displays the Feature Vertex List dialog (pictured below), which allows you to view, edit, and remove the individual vertex coordinates, including Z and timestamp values (if present) for the selected feature. The X and Y coordinates are listed in the native projection of the layer, and the Z coordinates will have the elevation units defined for the layer on the Projection tab of the Options dialog for the layer. You can also easily add per-vertex elevation values to features that do not already have them by pressing the *Add Elevs* button on the Feature Vertex List dialog. If timestamp values are present (like for a GPS tracklog), speed and bearing columns will also be displayed for each leg of the feature. You can also right-click on the vertex list for a feature with per-vertex elevations and choose the option to evenly spread the elevations to achieve a constant slope between the first and last elevation on the feature and also to replace any zero elevation values by interpolating between non-zero values. You can also add and edit per-vertex timestamps by right-clicking on the vertex list and selecting the appropriate option.

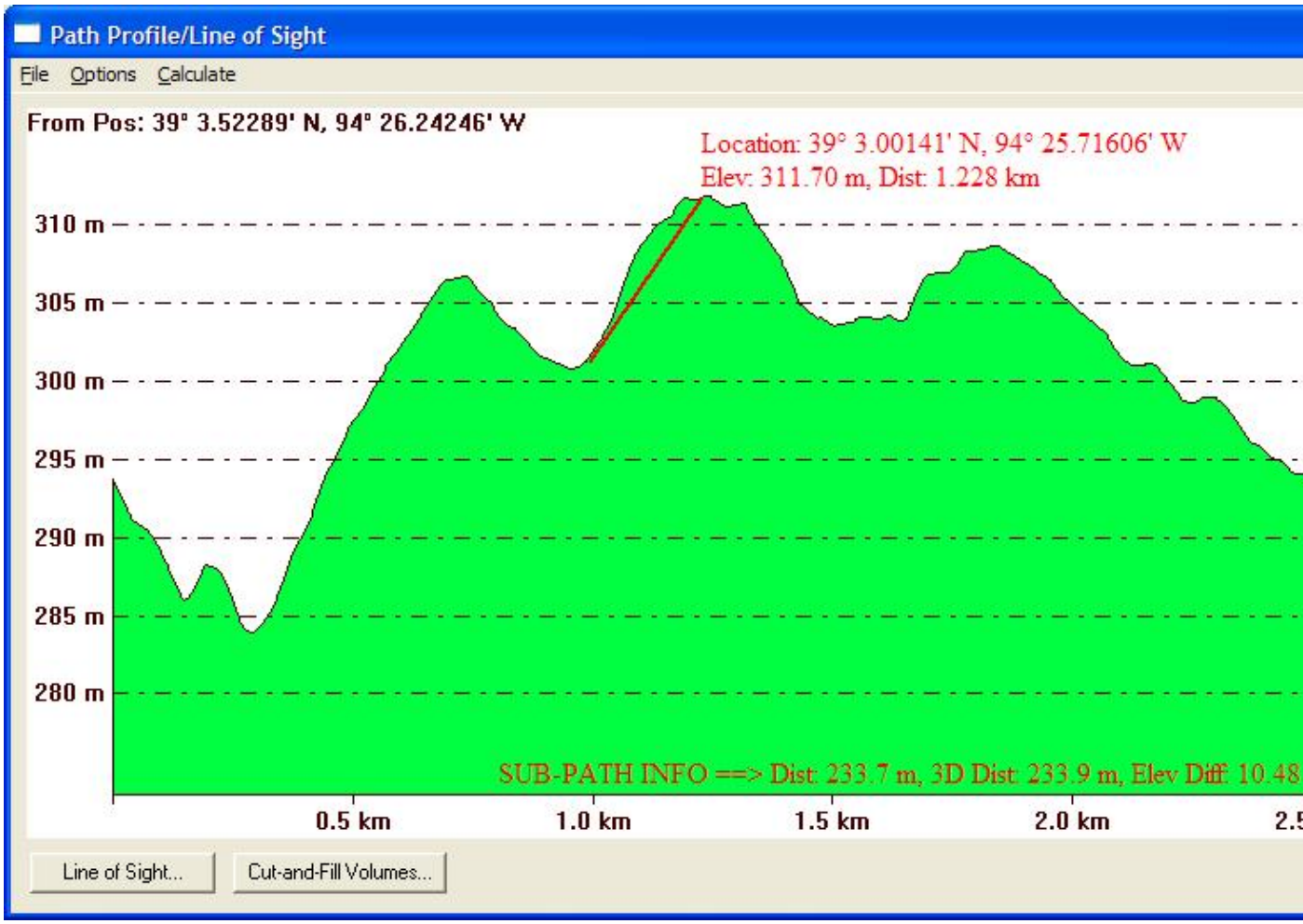


Path Profile/LOS Tool

The PathProfile/LOS command selects the 3D path profile/LOS (line of sight) tool as the current tool. This tool allows you to get a vertical profile along a user-specified path using loaded elevation datasets. In addition, registered users can perform line of sight calculations along the defined path.

To define the path along which to generate the 3D path profile, first select the path profile tool as your current tool. Press and release the left mouse button at the position where you wish to start the path. Move the mouse to the next position that you want to include in the path profile, then press the left mouse button again. Right click on the last location in the path profile to complete selecting points and display the *Path Profile/Line of Sight* dialog (pictured below). The *Path Profile/Line of Sight* dialog will appear displaying the 3D path profile of the selected path. Any points along the path that did not have elevation data underneath will be treated as an elevation of zero.

You can also generate 3D path profiles for existing line features by selecting the line feature in the Digitizer Tool, right clicking, then selecting the Generate Path Profile From Line option on the menu that is displayed.



The *Path Profile/Line of Sight* dialog displays the 3D path profile and provides several options related to the profile. A vertical scale is displayed on the left hand side of the profile window. The start and end coordinates of the path are displayed at the top of the profile window. If more than two points are in the path, the intermediate points will be marked in the profile window with a yellow dot. These intermediate points can be toggled on and off using an option available by right clicking on the path profile window. Also note that this dialog is resizable. If you have water display enabled on the Vertical Options tab of the Configuration dialog and there would be water along the path, that will be displayed as well.

Moving your cursor over the profile window displays information about the current cursor location along the profile, including the position and profile elevation at the cursor location. You can get information about a portion of the profile (a sub-path) by left clicking to start a sub-path definition, then left-clicking again at the

end of your desired sub-path. Details about the sub-path, like length, elevation change, and slope, will then be displayed on the bottom of the profile window.

Right clicking on the profile window brings up an options menu allowing the user to change the start and end positions, select the units (meters or feet) to display the elevations in, configure display of the path profile, and display a dialog containing details about the path. These options are also available under the Options menu on the dialog.

The *File* menu contains options allowing you to save the path profile/line of sight data to a file. The individual options are described below.

The *Save To Bitmap...* option allows registered users to save the contents of the path profile window to a Windows bitmap (BMP) file for use in other applications.

The *Save to BMP and Display on Main Map View* option allows registered users to save the contents of the path profile window to a Window bitmap (BMP) file and then display that BMP at a fixed location on the main map view. This is the equivalent of using the *Save to Bitmap* menu command, then closing the dialog and using the *File->Open Data File at Fixed Screen Location* menu command in the main map view.

The *Save CSV File (with XYZ and Distance Values...* option allows registered users to save all of the coordinates and distances to that location along the path profile to a CSV text file. Each line in the text file will be formatted as follow:

```
x-coordinate,y-coordinate,elevation,distance-from-start
```

The *Save Distance/Elevation...* option allows registered users to save all of the distances and elevations along the path profile to a text file. Each line in the text file will be formatted as follow:

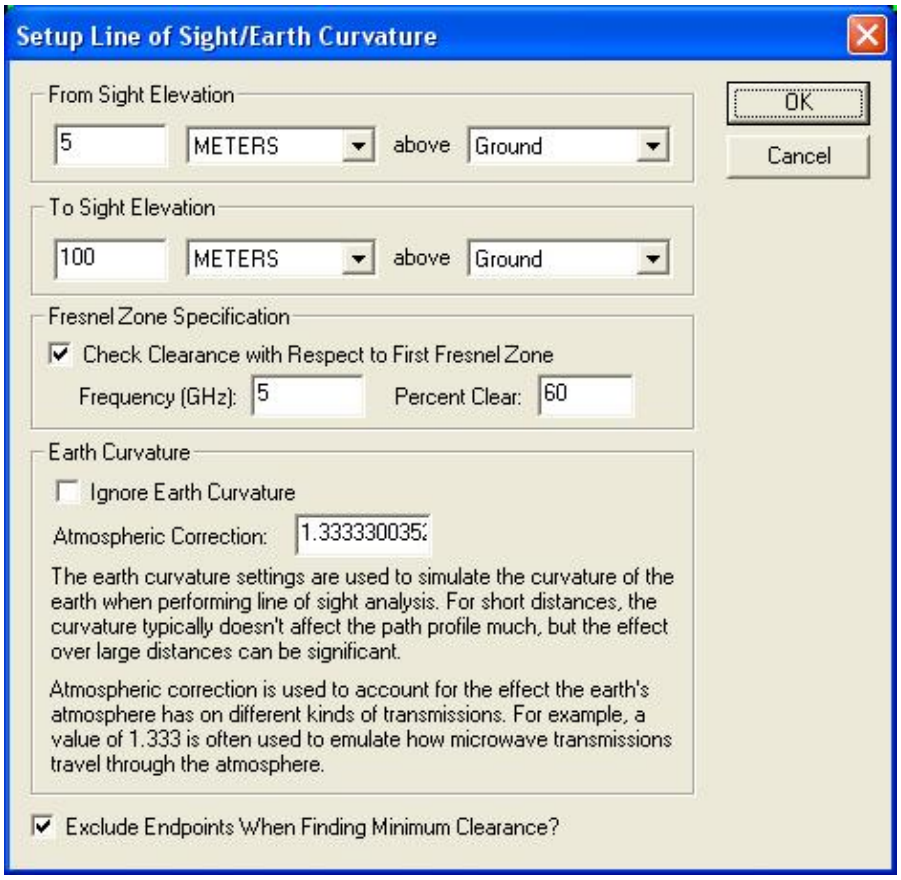
```
distance-from-start,elevation
```

The *Save To XYZ...* option allows registered users to save all of the positions and elevations along the path profile to a text file. Each line in the text file will be formatted as follow:

```
x-coordinate,y-coordinate,elevation
```

The *Save LOS to KML...* option allows registered users to save a 3D line of sight and, if selected, the Fresnel zone boundary lines, to a KML file for display in Google Earth.

Pressing the *Line of Sight...* button brings up the *Setup Line of Sight/Earth Curvature* dialog (pictured below), which allows the user to configure a line of sight calculation along the selected path. You can only perform a line of sight analysis if exactly two points are in the path profile (e.g. line of sight analysis cannot be performed on multi-segment paths).


Setup Line of Sight/Earth Curvature
From Sight Elevation
5
METERS
above
Ground
To Sight Elevation
100
METERS
above
Ground
Fresnel Zone Specification
Check Clearance with Respect to First Fresnel Zone
Frequency (GHz):
5
Percent Clear:
60
Earth Curvature
Ignore Earth Curvature
Atmospheric Correction:
1.333330035
The earth curvature settings are used to simulate the curvature of the earth when performing line of sight analysis. For short distances, the curvature typically doesn't affect the path profile much, but the effect over large distances can be significant.
Atmospheric correction is used to account for the effect the earth's atmosphere has on different kinds of transmissions. For example, a value of 1.333 is often used to emulate how microwave transmissions travel through the atmosphere.
Exclude Endpoints When Finding Minimum Clearance?
OK
Cancel

The *From Sight Elevation* section allows the user to select the height at the start position (left side of graph) to use in the line of sight calculations. This height can be specified in either feet or meters above the ground or above sea level. The *To Sight Elevation* section provides the same functionality for the end position (right side of graph).

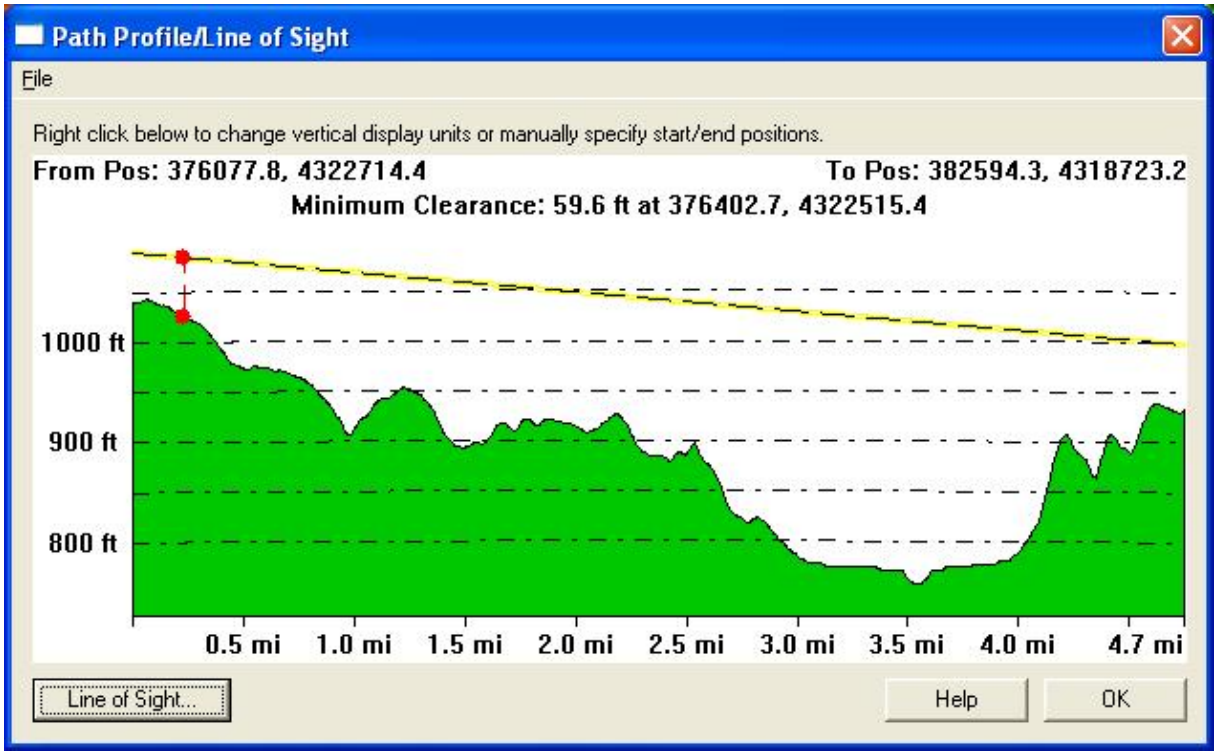
The *Fresnel Zone Specification* section allows you to have the line of sight analysis also check that a certain portion (the *Percent Clear* value) of the first Fresnel zone for a transmission of a particular frequency is clear. The typical standard is that good visibility requires that at least 60% (the default) of the first Fresnel zone for the specified frequency be clear of obstructions. If Fresnel zone clearance is being selected the specified percentage of the first Fresnel zone will be drawn on the line of sight analysis dialog as a dotted line underneath the straight sight line.

The *Earth Curvature* section allows the user to specify whether they want to take the curvature of the earth into account while performing the line of sight calculation. In addition, when earth curvature is being used, they can specify an atmospheric correction value to be used. The atmospheric correction value is useful when determining the line of sight for transmitting waves whose path is affected by the atmosphere. For example, when modeling microwave transmissions a value of 1.333 is typically used to emulate how microwaves are refracted by the atmosphere.

Selecting the *Exclude Endpoints when Finding Minimum Clearance* options causes the first and last 5% of the elevations along the profile to be ignored when finding the minimum clearance point.

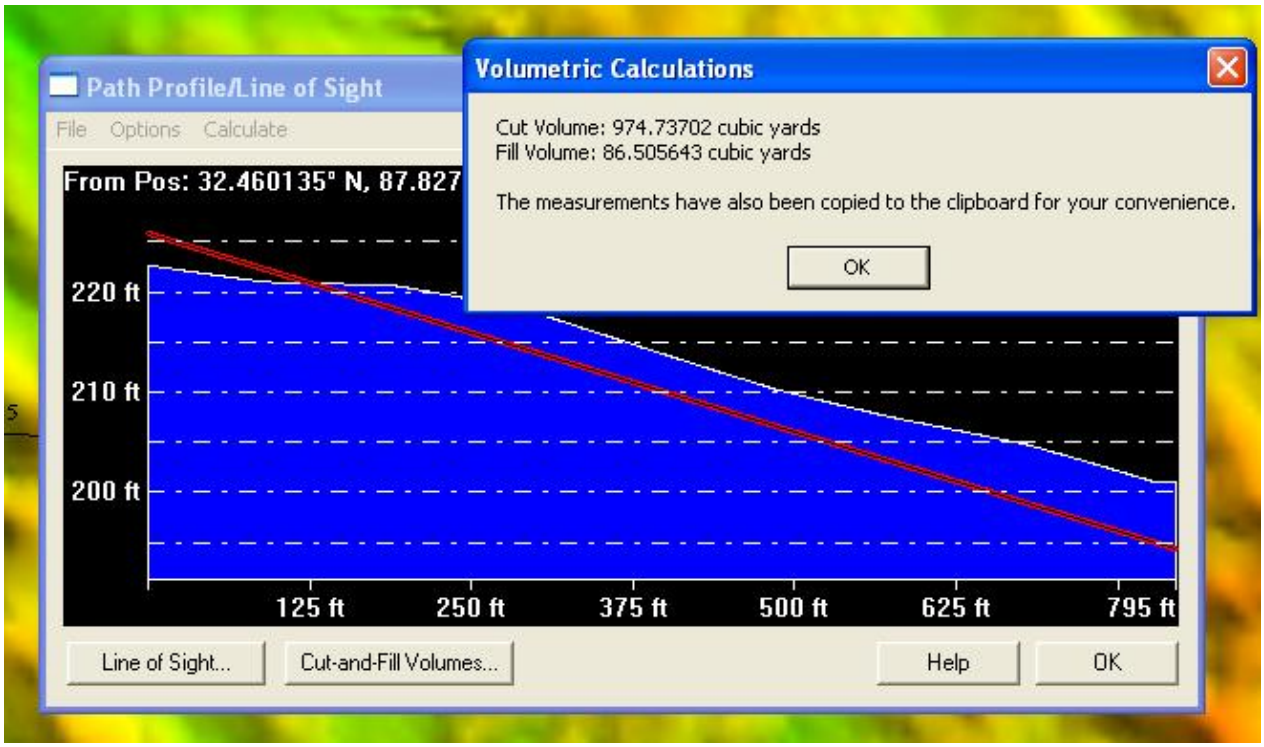
After setting up the line of sight calculation in the dialog and pressing the *OK* button, the line of sight will be displayed in the path profile window (pictured below). Along with the line depicted the actual line of sight, the position and vertical separation of the minimum clearance of the line of sight will be displayed with a

dashed red line in the path profile window.



Pressing the *Cut-and-Fill Volumes...* button brings up the *Setup Volume Calculation Parameters* dialog, allowing the user to perform a cut-and-fill volume analysis along the path using loaded terrain data. See the Measure Tool for more information on cut-and-fill volume setup.

Once you have performed a cut-and-fill analsyis, the cut line will be displayed on the path profile allowing easy visualization of the cut and fill areas along the path, as evidenced by the picture below.



View Shed Tool

The View Shed command selects the view shed analysis tool as the current tool. This tool allows registered users to perform a view shed analysis using loaded elevation grid data with a user-specified transmitter location, height, and radius. All areas within the selected radius that have a clear line of sight to the transmitter are colored with a user-specified color.

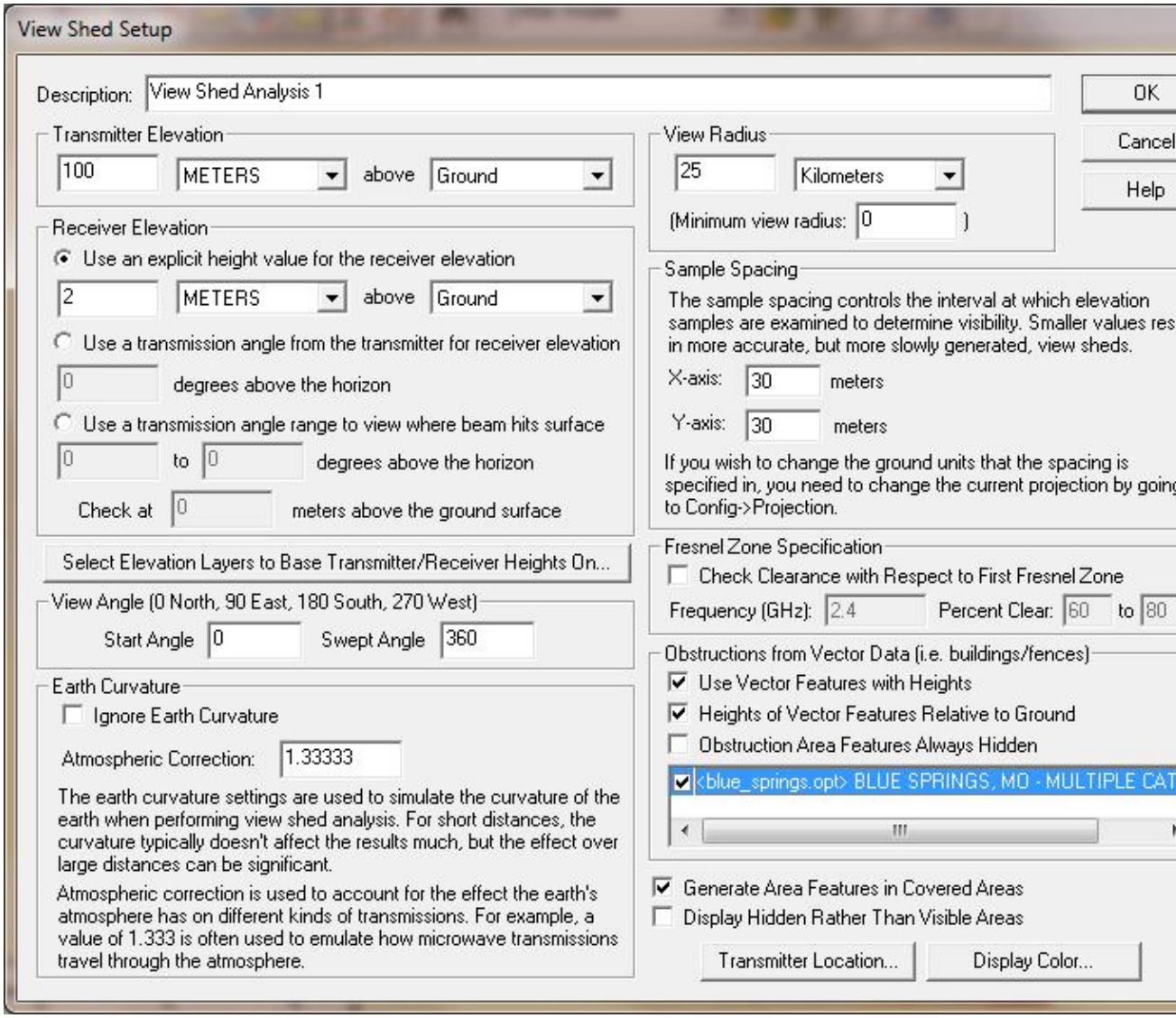
To perform a view shed analysis, first select the view shed tool as your current tool. Press and release the left mouse button at the position where you wish to place the transmitter. At this point, the *View Shed Setup* dialog (pictured below) will appear, allowing you to setup the view shed calculation.

You can also calculate views sheds at multiple point locations by selecting the point features at the desired locations in the Digitizer Tool, right clicking, then selecting the Calculate View Sheds at Selected Point(s) option on the menu that is displayed.

If you choose to perform view shed operations at selected point feature locations, the view shed calculation values will be initialized from attributes of that point feature. The values selected on the dialog will be used, except when one of the following attributes is present with a value to override what was selected on the dialog (this allows you to batch calculate view sheds at different locations with different parameters):

- OFFSETA - height above ground in meters (or feet if 'ft' in value) for transmitter (observation point)
- OFFSETA_MSL (or OFFSETA_MS if coming from a Shapefile) - height above sea level in meters (or feet if 'ft' in value) for transmitter (observation point)
- OFFSETB - height above ground in meters (or feet if 'ft' in value) for receiver
- OFFSETB_MSL (or OFFSETB_MS if coming from a Shapefile) - height above sea level in meters (or feet if 'ft' in value) for receiver
- AZIMUTH1 - start angle for view shed (0 is north, 90 is east, etc.)
- AZIMUTH2 - send angle for view shed (0 is north, 90 is east, etc.)
- RADIUS2 - outer radius in meters of view shed calculation

- RADIUS1 - inner radius in meters of view shed calculation (default is 0, which does entire radius)
- VERT1 - The top of the vertical angle to limit the scan (receiver angle range top value)
- VERT2 - The bottom of the vertical angle to limit the scan (receiver angle range bottom value)


View Shed Setup
Description: View Shed Analysis 1
OK
Cancel
Help
Transmitter Elevation
100
METERS
above
Ground
View Radius
25
Kilometers
(Minimum view radius: 0)
Receiver Elevation
Use an explicit height value for the receiver elevation
2
METERS
above
Ground
Use a transmission angle from the transmitter for receiver elevation
0
degrees above the horizon
Use a transmission angle range to view where beam hits surface
0
to
0
degrees above the horizon
Check at
0
meters above the ground surface
Sample Spacing
The sample spacing controls the interval at which elevation samples are examined to determine visibility. Smaller values res in more accurate, but more slowly generated, view sheds.
X-axis: 30 meters
Y-axis: 30 meters
If you wish to change the ground units that the spacing is specified in, you need to change the current projection by going to Config->Projection.
Select Elevation Layers to Base Transmitter/Receiver Heights On...
Fresnel Zone Specification
Check Clearance with Respect to First Fresnel Zone
Frequency (GHz): 2.4
Percent Clear: 60 to 80
View Angle (0 North, 90 East, 180 South, 270 West)
Start Angle 0
Swept Angle 360
Obstructions from Vector Data (i.e. buildings/fences)
Use Vector Features with Heights
Heights of Vector Features Relative to Ground
Obstruction Area Features Always Hidden
<blue_springs.opt> BLUE SPRINGS, MO - MULTIPLE CAT
Earth Curvature
Ignore Earth Curvature
Atmospheric Correction: 1.33333
The earth curvature settings are used to simulate the curvature of the earth when performing view shed analysis. For short distances, the curvature typically doesn't affect the results much, but the effect over large distances can be significant.
Atmospheric correction is used to account for the effect the earth's atmosphere has on different kinds of transmissions. For example, a value of 1.333 is often used to emulate how microwave transmissions travel through the atmosphere.
Generate Area Features in Covered Areas
Display Hidden Rather Than Visible Areas
Transmitter Location...
Display Color...

The *View Shed Setup* dialog provides options that allow the user to precisely setup the view shed analysis that they wish to perform.

The *Description* provides the user with a place to enter a name to identify this view shed analysis. This name will be displayed in the Overlay Control Center and will also be the name of the transmitter point created by the analysis for display on the map.

The *Transmitter Elevation* section allows the user to specify the height of the transmitter that the view shed analysis will be simulating.

The *Receiver Elevation* section allows the user to specify the minimum height above the ground or sea level from which the transmitter must be visible for the point to be considered visible. Most of the time you'll want to specify an elevation above ground, but specifying an elevation above sea level can

be useful for aviation purposes.

Optionally, you can also specify that the receiver elevation should be calculated based on an elevation angle relative to the horizon from the transmitter. This is useful if you have something like a radar dish that points up at some angle and you want to see where the signal can be seen.

Finally, you can also specify a transmission angle range for a beam transmitted from the transmitter. Then the view shed will depict where that beam would hit the terrain surface (or some user-specified distance above the surface).

The *Select Elevation Layer(s) to Base Transmitter/Receiver Heights On* button displays a dialog allowing you to select which of the loaded elevation layers you want to base ground-relative transmitter and receiver heights on. The default is to use all loaded layers, but if you have a situation where you have a ground level data set loaded and perhaps another set with heights of buildings, etc., you could use this option to cause the transmitter and receiver heights to be based on the ground elevation, whereas the actual visibility of each point will use the topmost of any loaded layer.

The *View Radius* section allows the user to specify how far in each direction from the transmitter to check for visibility. Typically you'd want to set this to the effective range of your transmitter. If you want to ignore areas close to the transmitter, you can also specify a *minimum view radius* value. Use the default of 0 to include everything from the transmitter out ot the selected view radius.

The *View Angle* section allows the user to limit the view shed to a particular subsection of the complete radial area. The *Start Angle* specifies the cartographic angle at which the radial subregion begins. This angle is a cartographic angle, meaning that 0 degrees is north and angles increase clockwise. The *Swept Angle* specifies the number of degrees clockwise to include in the view shed. For example, if the transmitter being analyzed sweeps an arc from due south to due west, a start angle of 180 with a swept angle of 90 would be used. To perform a view shed analysis over the entire area, keep the defaults of starting at 0 degrees and sweeping through 360 degrees.

The *Earth Curvature* section allows the user to specify whether they want to take the curvature of the earth into account while performing the view shed analysis. In addition, when earth curvature is being used, they can specify an atmospheric correction value to be used. The atmospheric correction value is useful when determining the view shed for transmitting waves whose path is affected by the atmosphere. For example, when modeling microwave transmissions a value of 1.333 is typically used to emulate how microwaves are refracted by the atmosphere.

The *Sample Spacing* section allows the user to specify the spacing of elevation samples when calculating the view shed. The sample spacing controls the interval at which elevation samples are examined to determine visibility. Smaller values result in more accurate, but more slowly generated, view sheds.

The *Fresnel Zone Specification* section allows you to have the view shed analysis also check that a certain portion (the *Percent Clear* value) of the first Fresnel zone for a transmission of a particular frequency is clear. The typical standard is that good visibility requires that at least 60% (the default) of the first Fresnel zone for the specified frequency be clear of obstructions. If you specify a maximum Fresnel zone percentage clear other than 100%, only those locations where the minimum percentage of the 1st Fresnel zone that is clear is between your specified percentages will be marked as visible.

The *Obstructions from Vector Data* section allows the user to specify whether or not loaded vector data with elevation values should be considered when performing the view shed analysis. This allows the user to use things like buildings, fence lines, towers, etc. to block portions of the view, creating a more realistic view shed. If the user elects to use vector data, they can also specify whether the elevation values stored with vector features are relative to the ground or relative to mean sea level. Typically heights for vector features are specified relative to the ground. If any area features are included and their heights are relative to the ground, the obstruction heights within those areas will be increased by the specified amount, but any receiver heights will still be based on the terrain. This makes things like wooded areas very easy to model. The *Obstruction Area Features Always Hidden* option allows you to specify that any locations within an obstruction area will be marked as hidden, rather than only those that actually would be hidden.

If checked, the *Display Hidden Rather than Visible Areas* option causes the generated view shed to cover those areas that would NOT be visible, rather than those that would be visible from the transmitter location.

If checked, the *Generate Area Features in Covered Areas* option specifies that view shed coverage area (polygon) featuers should be generated for those areas that are visible. These generated area features then behave just like any other vector feature and can be exported to vector formats, like Shapefiles, for use in other software.

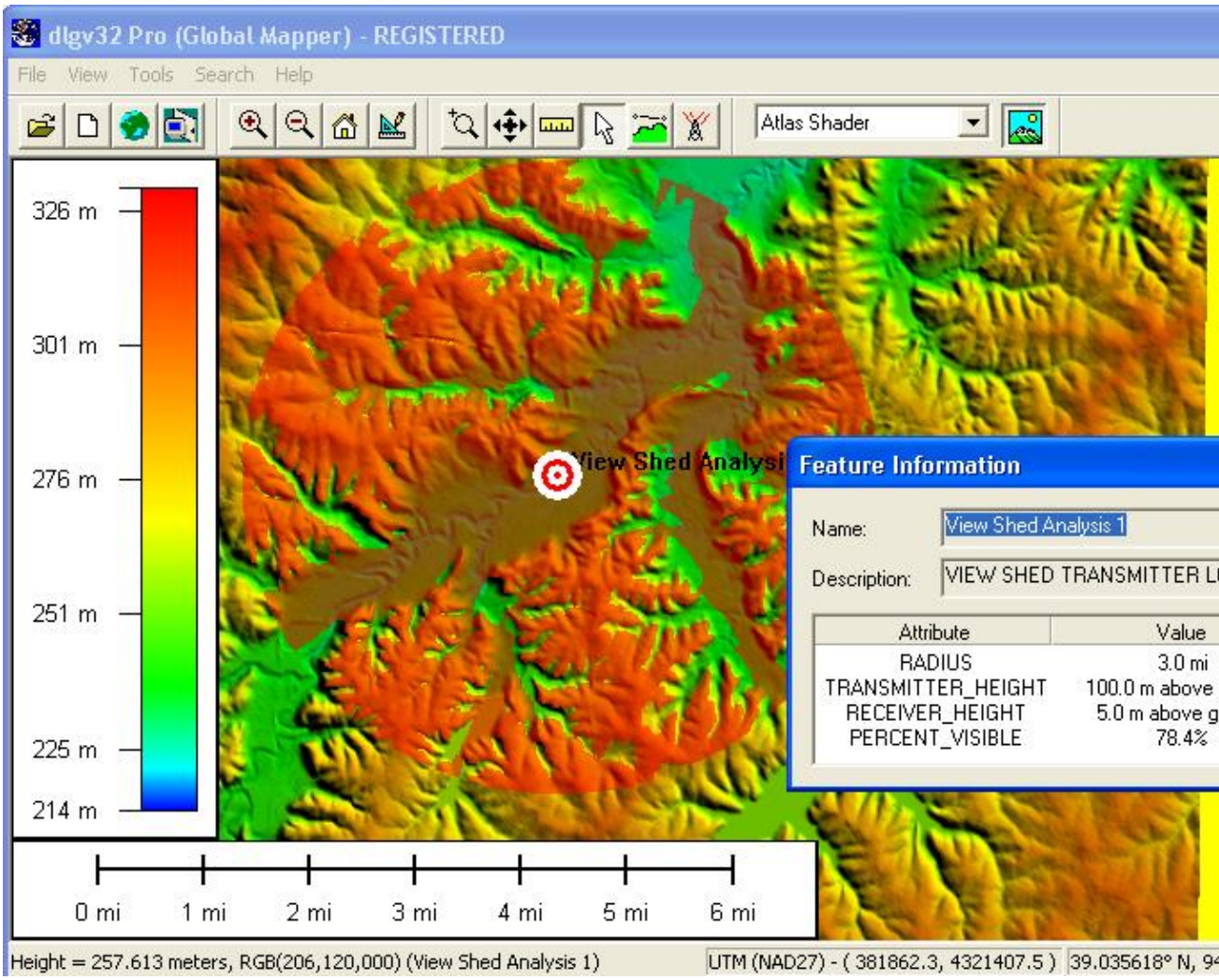
Pressing the *Select Transmitter Location...* button displays a dialog that allows the user to adjust the exact transmitter coordinates from the coordinates where they clicked.

Pressing the *Select Display Color...* button displays a dialog that allows the user to select the color in which to display the visible areas on the map.

After setting up the view shed calculation in the dialog and pressing the *OK* button, the view shed analysis will be performed and when complete, the results will be displayed on the main map display as a new overlay. All visible areas within the specified radius will be displayed using the selected color. The overlay will default to being 50% translucent, allowing you to see areas underneath the view shed. You can modify the translucency of the overlay in the Overlay Control Center.

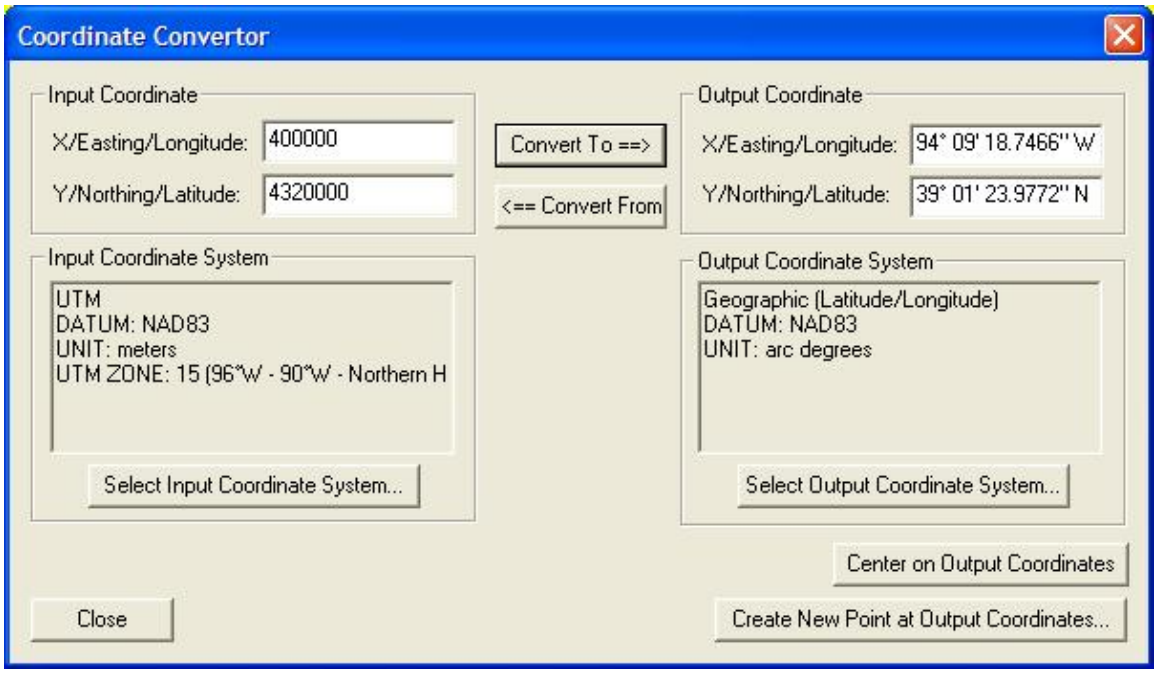
In addition, a small radio tower point will be created at the selected transmitter location. When selected using the pick tool, this point displays information about the view shed analysis as shown below.

If you would like to modify the settings used to calculate the view shed and recalculate it using currently loaded data, you can right click on the View Shed layer in the Overlay Control Center and select the option to modify the view shed.


dlgv32 Pro (Global Mapper) - REGISTERED
File View Tools Search Help
Atlas Shader
326 m
301 m
276 m
251 m
225 m
214 m
0 mi 1 mi 2 mi 3 mi 4 mi 5 mi 6 mi
Feature Information
Name: View Shed Analysis 1
Description: VIEW SHED TRANSMITTER L
Attribute Value
RADIUS 3.0 mi
TRANSMITTER_HEIGHT 100.0 m above
RECEIVER_HEIGHT 5.0 m above g
PERCENT_VISIBLE 78.4%
Height = 257.613 meters, RGB(206,120,000) (View Shed Analysis 1)
UTM (NAD27) - (381862.3, 4321407.5)

Coordinate Convertor Command

Selecting the Coordinate Convertor... menu item displays the *Coordinate Convertor* dialog (picture below). This dialog allows you to easily convert a coordinate in one projection/datum/unit system to another. When a conversion is made the results are automatically copied to the clipboard for easy pasting in another location using Ctrl+V. There are also buttons to allow you to easily recenter the map on the coordinates or to create a new point feature at the coordinates.



Control Center Command

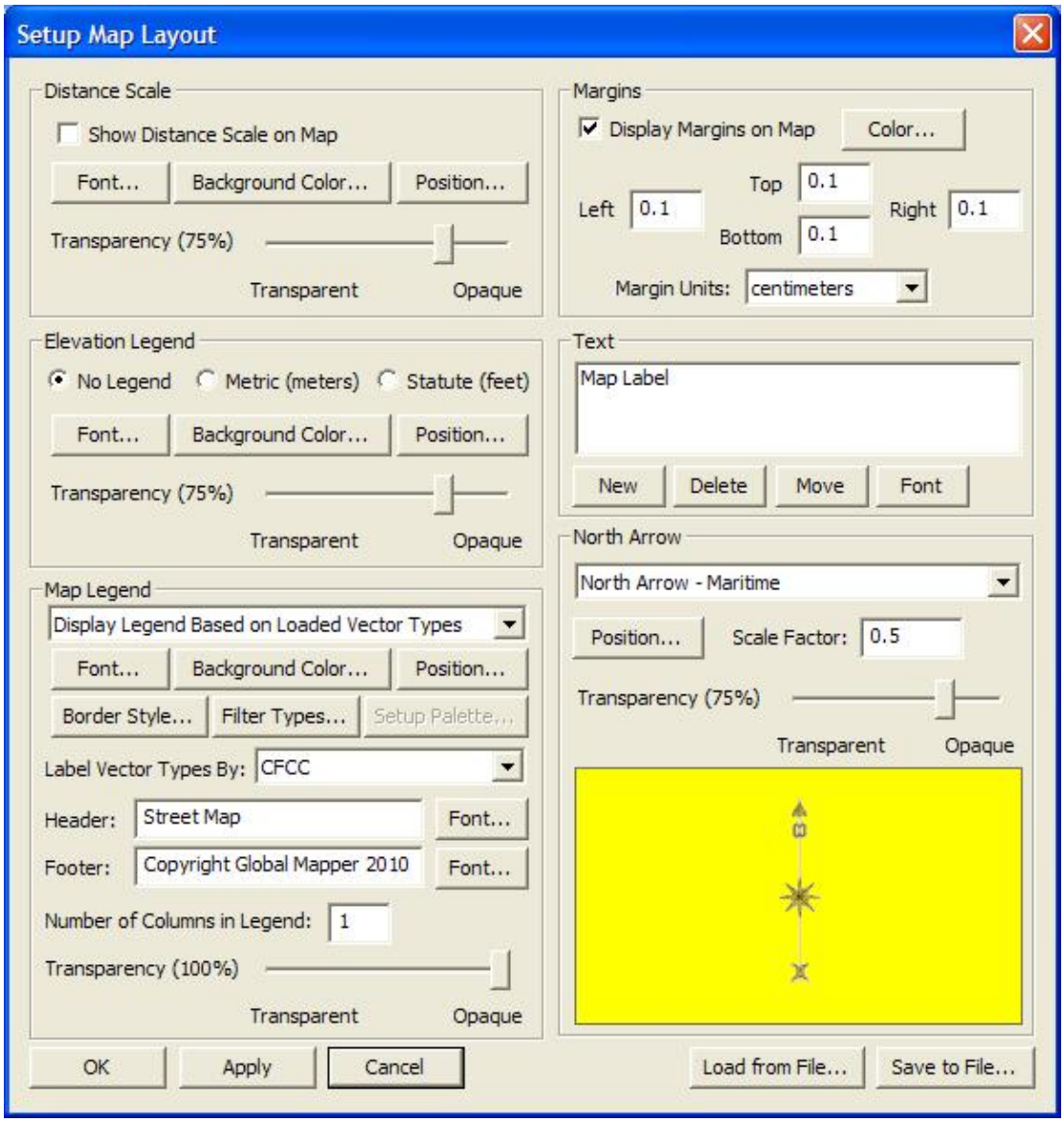
Selecting the Control Center... menu item or toolbar button displays the *Overlay Control Center* dialog. This dialog is the central control center for obtaining information and setting options for all loaded overlays. See the Overlay Control Center section for complete details.

Configure Command

Selecting the Configure... menu item or toolbar button displays the *Configuration* dialog. This dialog provides for general setup of Global Mapper display options. See the Configuration section for complete details.

Map Layout Command

Selecting the Map Layout... menu item or toolbar button displays the *Map Layout* dialog (pictured below). This dialog provides for setup of the map display, including specifying the placement and display of the distance scale bar, elevation legend, margins, map legend and north arrow. There are also options to save and map layout to a file and restore it later. In addition, the current map layout will be saved to any workspace files.



The *Map Legend* section allows you to setup the display of a map legend on the display. You can setup your map legend to use one of the following types:

- *No Map Legend* - no map legend is displayed on the map.
- *Display Legend Based on Loaded Vector Types* - a map legend is generated based on the list of loaded vector types and their drawing styles. There will be a separate entry on the legend for each unique combination of type and style. You can filter the list of type that are displayed on the map legend using the **Filter Types** button.
- *Display Legend Based on Color Palette* - a map legend is generated based on a color palette (i.e. a list of colors and names. You can setup the palette to use for generating the map legend using the **Setup Palette** button. On that dialog you can manually enter colors and their names, load a palette from a file, or initialize a palette from the palette of a loaded file.
- *Display Legend Based on Vector Types and Palette* - this option is a combination of the previous two item. Both entries from the loaded vector types/styles and from a customizable color palette will be used.

Digitizer Tool

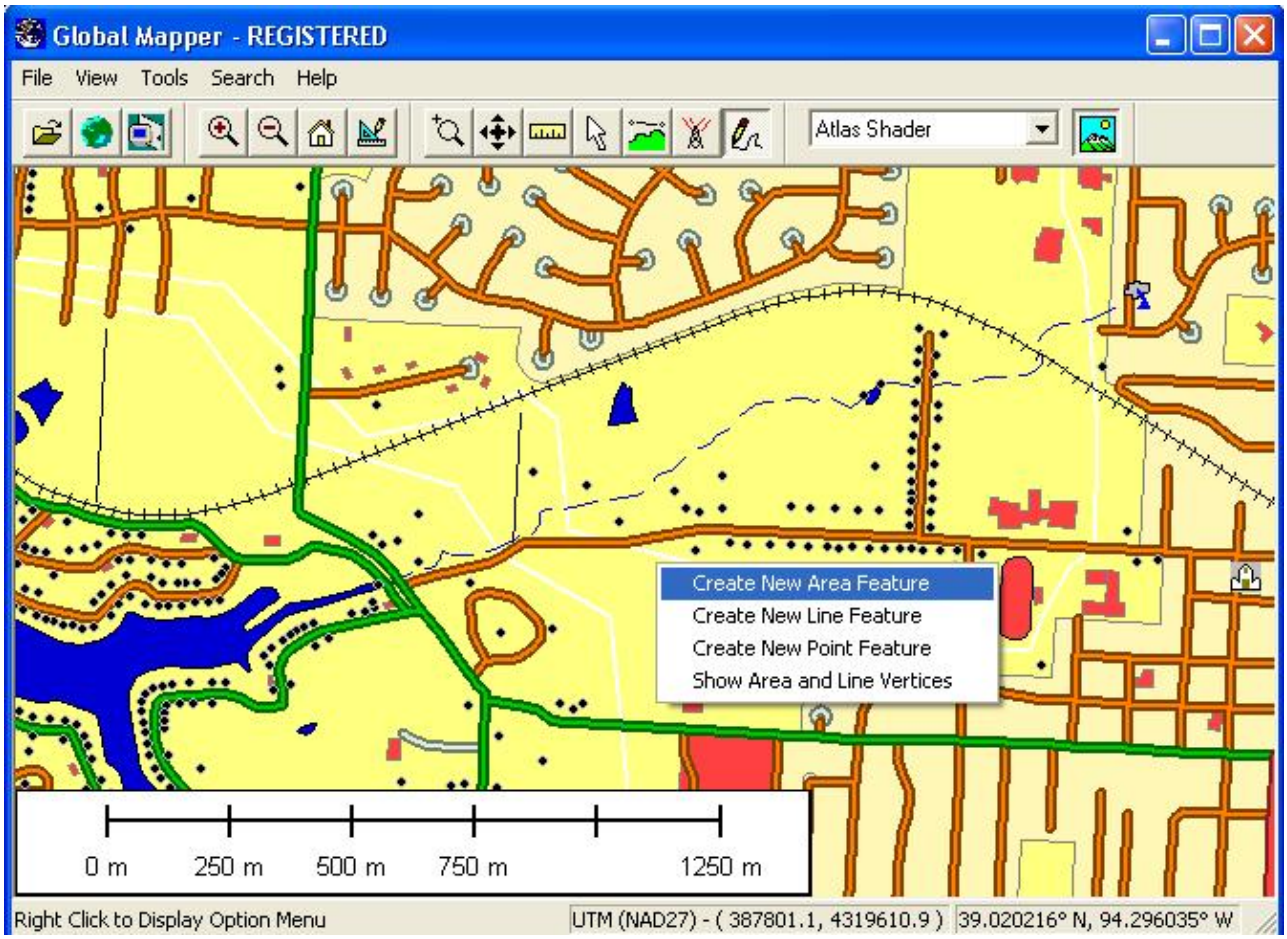
The Digitizer Tool allows you to modify existing vector features as well as to create new ones. This tool encompasses a lot of functionality, from modifying the shape and position of area, line, and point features, to editing the attribution and drawing styles of individual vector features. The major activities available with the Digitizer Tool are described below.

- Creating New Features
  - Creating New Area Features
  - Creating New Line Features
  - Create New Line Features with Distance/Bearing/COGO Input
  - Creating New Point Features
  - Creating New Range Ring Features
  - Create Buffer Areas a Fixed Distance Around Features
  - Creating Shape (e.g. Circle, Rectangle, etc.) Features
  - Create Strike-and-Dip (Geology-Related) Features
  - Create Regular Grid of Area Features of User-Specified Size/Orientation
  - Create Points Spaced Along Area and Line Features
- Editing Existing Features
  - Selecting Features
  - Selecting Vertices
  - Editing Feature Attributes and Drawing Styles
  - Deleting/Undeleting Features
  - Moving Features
  - Changing the Shape of Area and Line Features
  - Rotating and Scaling Features
  - Combining Area and Line Features
  - Finding the Intersection of Multiple Area Features
  - Cutting Areas From/Adding Islands to Area Features
  - Splitting Areas into Two New Area Features
  - Cropping/Splitting Line Features to Area Features
- Copying Features (Cut/Copy/Paste)
- Snapping to Existing Features When Drawing
- Snapping Vertically/Horizontally When Drawing
- Un-doing Digitization Operations
- Additional Feature Operations
  - Adding Elevation Values from Terrain to Features
  - Generating a 3D Path Profile from a Line or Area Feature
  - Calculating View Sheds at Multiple Point Locations
  - Calculating Elevation Statistics within Selected Area/Line Features
  - Calculating Cut-and-Fill Volumes for Area and Line Features
  - Working with Feature Measurements (i.e. Length, Enclosed Area)
  - Automatically Inserting Vertices at Line Intersections
  - Finding Non-Connected Line Endpoints (i.e. Connectivity Checks)
  - Finding Nearby Points
  - Flattening Terrain Using Area Features
  - Adding Address Information to Points from Nearby Road Features
  - Adding Coordinate Attributes to Point Features
  - Adding Attributes to Features from Other Featuresmike1460
  - Counting Features Contained within Area Features

♦ Converting Areas with Islands to Single Vertex List

Creating New Features

At any time that the Digitizer Tool is active, you have the option to create new area, line, and point features simple by right clicking and selecting either the *Create New Area Feature*, *Create New Line Feature (Vertex or Trace Mode)*, or *Create New Point Feature* options on the popup menu (pictured below). Any new features created can be exported to new vector files in any of the supported vector export format (DXF, Shapefile, etc.).



Creating New Area Features

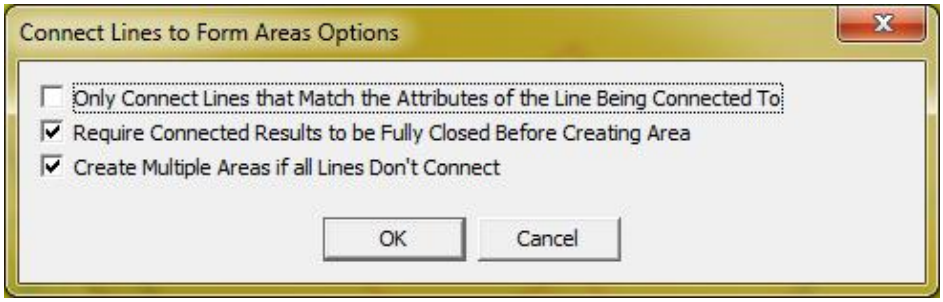
After selecting the *Create New Area Feature* popup menu option, you can proceed to draw a new area feature with the mouse. To draw the feature, simple left click at each place that you'd like to drop a vertex. To finish the area feature, right click at the desired location of the last vertex to complete the area. You can cancel creation of the new area at any time by pressing the Escape key. Note that while drawing the area you can use the *Snapping* feature to help align the area with existing features.

Once you've completed drawing the area, the *Modify Feature Info* dialog will appear allowing you to setup the label, classification, drawing style, and attribution for the area. The perimeter and enclosed area of the area feature will be added as default attributes. The units for these measurements can be modified on the General tab of the Configuration dialog. See *Editing Feature Attributes and Drawing Styles* for more details.

Once you have completed have completed creating the area, the Digitizer Tool will remain in the area creation mode, so you can simply start left-clicking to draw another area, or right-click to choose a different mode.

You can also create new area features from selected line features by selecting a collection of lines, then right-clicking and selecting the *Advanced Feature Creation Options->Create New Area Feature(s) from Selected Line Feature(s)* menu command. This will attempt to connect the selected line features to build area features. All line features will be connected as far as possible, then closed to create a new area feature. When you select this option, the dialog shown below will appear allowing you to setup the rules governing how areas will be formed. The rules have the following meanings:

- Only Connect Lines that Match the Attributes of the Line Being Connected To - If checked, this option indicates that line features will only connect to other line features that have compatible labels, descriptions, and attributes.
- Require Connected Results to be Fully Closed Before Creating Area - If checked, this option indicates that only connected line paths that fully close to form a complete area will be turned into areas. If not checked, any path will be closed with a straight line between the two endpoints once no more connections can be found.
- Create Multiple Areas if All Lines Don't Connect - If checked, this option indicates that if all of the selected lines don't connect to form a single path, then multiple area features will be generated, one for each independent connected path.


Connect Lines to Form Areas Options
Only Connect Lines that Match the Attributes of the Line Being Connected To
Require Connected Results to be Fully Closed Before Creating Area
Create Multiple Areas if all Lines Don't Connect
OK
Cancel

Creating New Line Features

After selecting the *Create New Line Feature (Vertex Mode)* popup menu option, you can proceed to draw a new line feature with the mouse. To draw the feature, simple left click at each place that you'd like to drop a vertex. To finish the line feature, right click at the desired location of the last vertex. You can cancel creation of the new line at any time by pressing the Escape key. Note that while drawing the line in Vertex Mode you can use the *Snapping* feature to help align the line with existing features.

You can also choose to draw a line using the *Create New Line/Area Feature (Trace Mode)* popup menu option. To draw the feature, simple press the left button to start the line/area, then trace the path to draw using your mouse while keeping the left button pressed. To finish the feature, simply release the left button. You can cancel creation of the new feature at any time by pressing the Escape key or just releasing the left button then pressing Cancel on the dialog that appears. If you are using a digitizing table just select this mode, then press down the pen to start, trace the path, then release it to end. If your drawn path is nearly closed, you will be asked whether to create a closed area feature from the path or just keep it as a line feature.

Once you've completed drawing the line, the *Modify Feature Info* dialog will appear allowing you to setup the label, classification, drawing style, and attribution for the line. The length of the line feature will be added as a default attribute. The units for the length measurement can be modified on the General tab of the

Configuration dialog. See *Editing Feature Attributes and Drawing Styles* for more details.

Once you have completed have completed creating the line, the Digitizer Tool will remain in the line creation mode, so you can simply start left-clicking to draw another line, or right-click to choose a different mode.

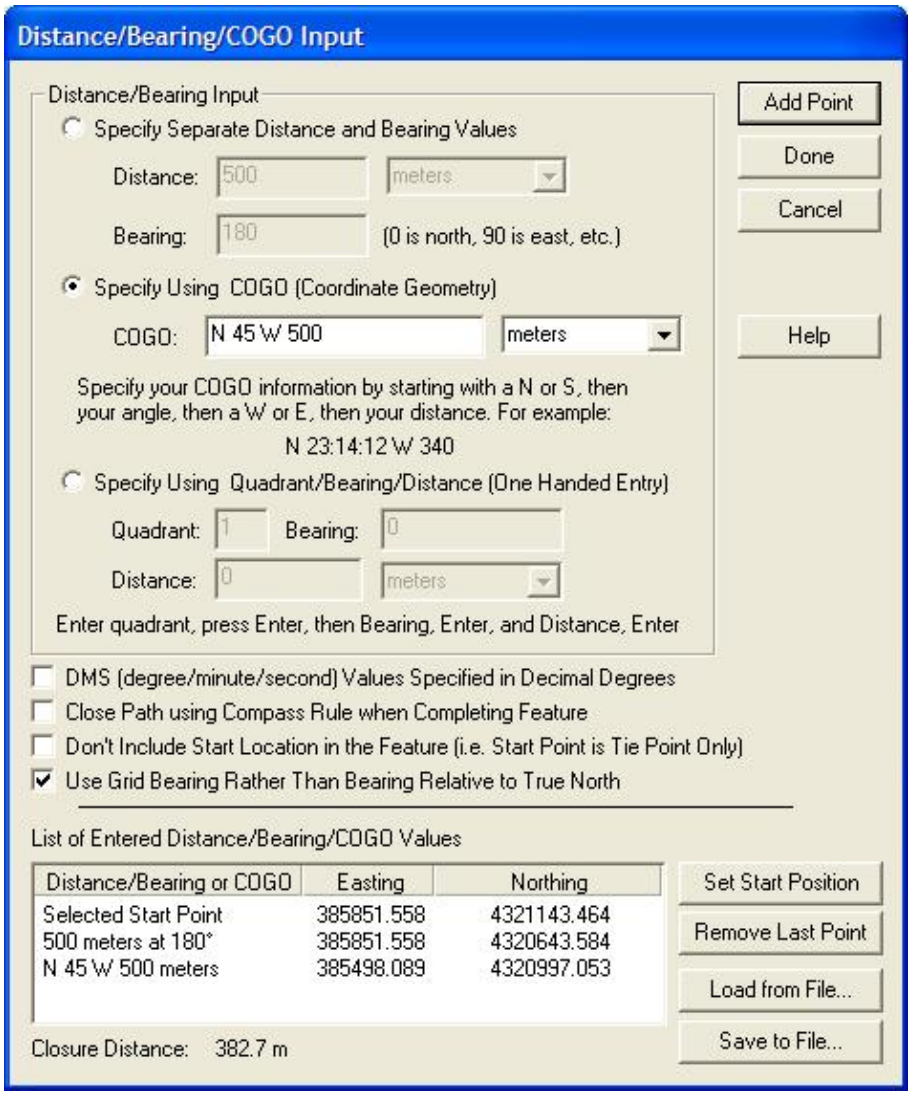
You can also create new line features from selected area features by selecting one or more areas, then right-clicking and selecting the *Advanced Feature Creation Options->Create New Line Feature(s) from Selected Area Feature(s)* menu command. This will create a single closed line feature from each selected area feature.

Creating New Line Features with Distance/Bearing/COGO Input

After selecting the *Create New Line with Dist/Bearing/COGO* popup menu option, you can proceed to select the starting location of the new line feature by left clicking at the desired start location. Note that while selecting the start point for the line you can use the *Snapping* feature to help align the line with existing features.

After selecting the starting location, the Distance/Bearing/COGO Input dialog (pictured below) will display, allowing you to enter distance/bearing information for additional points either as separate distance/bearing values, as a COGO (Coordinate Geometry) coordinates (see below for explanation), or as a quadrant/bearing/distance value. Once you have entered all of your points, press Done to complete the process and create the new line feature.

You can also check the option to *Close Path Using Compass Rule when Completing Feature*. If this option is checked, all of the points will be adjusted using the compass rule to ensure that the shape is closed. The compass rule evenly distributes the shift required to close the shape to all vertices and is commonly used by surveyors.


Distance/Bearing/COGO Input
Distance/Bearing Input
Specify Separate Distance and Bearing Values
Distance: 500 meters
Bearing: 180 (0 is north, 90 is east, etc.)
Specify Using COGO (Coordinate Geometry)
COGO: N 45 W 500 meters
Specify your COGO information by starting with a N or S, then your angle, then a W or E, then your distance. For example:
N 23:14:12 W 340
Specify Using Quadrant/Bearing/Distance (One Handed Entry)
Quadrant: 1 Bearing: 0
Distance: 0 meters
Enter quadrant, press Enter, then Bearing, Enter, and Distance, Enter
DMS (degree/minute/second) Values Specified in Decimal Degrees
Close Path using Compass Rule when Completing Feature
Don't Include Start Location in the Feature (i.e. Start Point is Tie Point Only)
Use Grid Bearing Rather Than Bearing Relative to True North
List of Entered Distance/Bearing/COGO Values
Distance/Bearing or COGO
Easting
Northing
Selected Start Point 385851.558 4321143.464
500 meters at 180° 385851.558 4320643.584
N 45 W 500 meters 385498.089 4320997.053
Closure Distance: 382.7 m
Add Point
Done
Cancel
Help
Set Start Position
Remove Last Point
Load from File...
Save to File...

One Handed Entry of Values

You can achieve very fast entry of large collections of distance/bearing of quadrant/distance/bearing values by simply using the number pad and pressing Enter after each value. This will take you to the next field and finally add the point when you press Enter on the last field. This will also take you back to the first field to allow continuously adding points with only one hand, keeping your other hand free to mark your place on the list of values.

Notes on Bearings

When entering data using the *Specify Separate Distance and Bearing Values* option, the bearing values are degrees clockwise from true north, so 0 degrees is north, 90 degrees is east, etc. For the *Specify Using Quadrant/Bearing/Distance* option, you specify a quadrant value of 1 to 4, with 1 being the NE quadrant, 2 being the SE quadrant, 3 being the SW quadrant, and 4 being the NW quadrant. The bearing values are then east of the NS line for quadrants 1 and 2 and west of the NS line for quadrants 3 and 4.

It is also important to remember that any bearing are specified relative to true north (unless you check the *Use Grid Bearings Rather Than Bearing Relative to True North*), so if your projection isn't oriented so that straight up is true north (most projected systems, like UTM, are not unless you are right at the projection

center) a line of bearing 0 won't be straight up, but will be slightly skewed so that it points at the North Pole. A line of bearing 0 will be straight up in projections like Geographic or Mercator where true north is always straight up.

If you check the *DMS (degree/minute/second) Values Specified in Decimal Degrees* option, you can enter your DM (degree/minute) or DMS (degree/minute/second) values as decimal degrees. For example with this option checked, a value of 40.3020 is interpreted as 40 degrees, 30 minutes, and 20 seconds. The basic format of degree fields when this option is checked is DD.MMSS.

Example COGO Input

```
N 23:14:12 W 340
S 04:18:56 E 230
```

The first character of a COGO input string must be either the character 'N' or 'S' to indicate whether the bearing is relative to the north or south directions. After another space, the angle begins. The angle can be in any angle specification that Global Mapper supports, including degrees, degrees/minutes, or degrees/minutes/seconds. A space follows the angle, and is then followed by either the 'E' or 'W' characters. A space separates the bearing from the distance (which should be in appropriate linear units).

For those unfamiliar with the notation for bearings: Picture yourself in the center of a circle. The first hemispere notation tells you whether you should face north or south. Then you read the angle and either turn that many degrees to the east or west, depending on the second hemisphere notation. Finally, you move *distance* units in that direction to get to the next station.

Creating New Point Features

After selecting the *Create New Point Feature* popup menu option, you can proceed place the point feature by left clicking at the desired location of the point. You can cancel creation of the new point at any time by pressing the Escape key.

You can also use the *Create New Point Feature at Specified Position* option to create a new point feature at a manually specified location. When you select this option, a dialog appears allowing you to enter the location for the new point feature in either latitude/longitude coordinates or coordinates in the current view projection.

Once you've placed the point, the *Modify Feature Info* dialog will appear allowing you to setup the label, classification, drawing style, and attribution for the new point feature. See *Editing Feature Attributes and Drawing Styles* for more details.

Once you have completed have completed creating the point feature, the Digitizer Tool will remain in the point creation mode, so you can simply left-click to place another point, or right-click to choose a different mode.

You can also create new point features from the centroids of selected area features or from the vertices of selected line and area features by selecting one or more areas or lines, then right-clicking and selecting the appropriate option under the *Advanced Feature Creation Options* menu.

Creating New Range Ring Features

After selecting the *Create Range Ring(s)* popup menu option, you can proceed to place the center location of your range rings by left clicking at the desired location. If you had point features selected when you selected

this option you can also choose to create the rings centered on the selected point feature(s) rather than manually specifying a center location. You can cancel creation of the range ring(s) at any time by pressing the Escape key or right clicking.

After selecting the center of your range ring(s), the *Select Range Ring Parameters* dialog (pictured below) appears and allows you to setup how many range rings you would like to create and how far apart you would like to create them. You can choose to create rectangles with the specified range as the radius rather than a ring if you would like. You can also choose to create a "multi-ring". Checking this box will delay the actual range ring creation until you have added additional range rings and unchecked the box. Then all rings in the "multi-ring" will be combined if possible to build nice looking combined range rings.

Once you have completed have completed creating the range ring(s), the Digitizer Tool will remain in the range ring creation mode, so you can simply left-click to create additional range rings centered on another location, or right-click to choose a different mode.

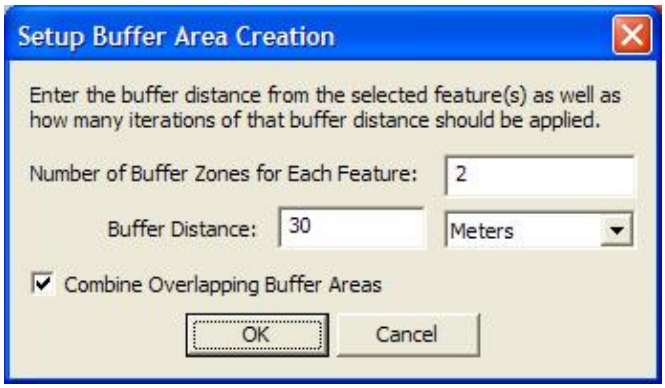
Select Range Ring Parameters
Enter the number of range ring areas to create as well as how far apart each range ring should be. You can also modify the range ring center coordinate if you'd like.
OK
Cancel
Create Point at Center of Range Rings
Create Rectangle(s) Instead of Ring(s)
Number of Range Rings:
3
Range Ring Radius:
1
Kilometers
Modify Range Center Point Coordinates...
Combining Multiple Rings (Advanced Users)
Combine Ring with Additional Rings to Follow
Use this feature to specify multiple range rings that you want combined into a single ring feature around the combined ranges. Uncheck this box when specifying the ring parameters for the last ring in the "multi-ring" to complete the process.

The range ring feature has numerous applications, including search-and-rescue and aviation.

Creating Buffer Areas Around Selected Features

After selecting the *Create Buffer Areas Around Selected Feature(s)* option in the *Advanced Feature Creation* popup menu, the *Setup Buffer Areas* dialog (pictured below) appears and allows you to setup how many buffer areas that you want to create around each selected feature and at what distance to space them. For example, if you want to create buffers at distances of 100, 200, and 300 meters around each selected feature, you would specify that you want to create 3 buffer areas with a buffer distance of 100 meters. If you would like to combine all overlapping buffers into larger combined areas, simply check the option to *Combine Overlapping Buffer Areas*. To create buffers some distance inside a selected area feature rather than outside of it, simply specify a negative buffer distance.

Once you have completed have completed creating the buffer areas(s), the newly created areas will automatically be selected so you can easily right-click to edit them, display measurement information, etc.


Setup Buffer Area Creation
Enter the buffer distance from the selected feature(s) as well as how many iterations of that buffer distance should be applied.
Number of Buffer Zones for Each Feature:
2
Buffer Distance:
30
Meters
Combine Overlapping Buffer Areas
OK
Cancel

Creating New Shape (e.g. Circle, Rectangle, etc.) Features

Under the *Create Area Shapes* and *Create Line Shapes* right-click popup menus you will find options to create Arc, Circular, Elliptical, Rectangular, and Square area and line features. For all of these shape types (except the rectangular/square option where you manually enter the coordinates), you click and hold the left mouse button at the center of the feature, then drag it until it is of the desired shape. For Circular/Elliptical features and Arcs, the default shape follows a circle and holding down the SHIFT key will dragging will result in an ellipse. For Rectangular/Square features, the default shape is a rectangle and holding down the SHIFT key will force the dragged shape to be square. If you hold down the 'T' key when left clicking to start the shape, the start point will be treated as the top left corner of the feature rather than the center of the shape feature.

Once the shape is to your liking, release the left mouse button and the *Modify Feature Info* dialog will appear allowing you to setup the label, classification, drawing style, and attribution for the new feature. See *Editing Feature Attributes and Drawing Styles* for more details.

Once you have completed have completed creating the shape, the Digitizer Tool will remain in the selected shape creation mode, so you can simply start drawing a new shape, or right-click to choose a different mode.

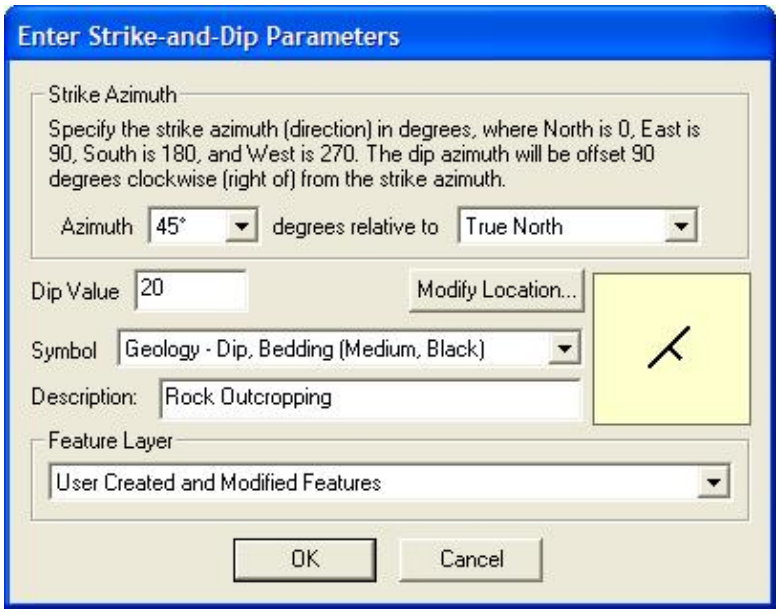
Create Strike-and-Dip (Geology-Related) Features

After selecting the *Create Strike-and-Dip Point* popup menu option, you can proceed to select the location of your new point by left clicking at the desired location. If you drag the cursor in the direction of the strike then release it, the point will be placed at the start of the mouse drag and the strike/dip azimuth will automatically be initialized to the direction that you dragged. You can cancel creation of the point(s) at any time by pressing the Escape key or right clicking.

After selecting the locationof your strike-and-dip point, the *Enter Strike-and-Dip Parameters* dialog (pictured below) appears and allows you to setup your point. This includes selected the azimuth angle for your strike, either relative to True North (the default) or to the top of the map screen, the dip value for your point (which will be used as the display label on the map), the symbol to use, an optional description, and which layer in the Control Center to place the new point feature. There is also a *Modify Location* button which allows you to fine-tune the location of the point by manually entering coordinates.

Once you have completed have completed creating the strike-and-dip point, the Digitizer Tool will remain in the strike-and-dip creation mode, so you can simply left-click to create additional points centered on another location, or right-click to choose a different mode. If you hold down the Ctrl key when left-clicking to create additional points the new strike-and-dip point will automatically be created at the clicked location using the

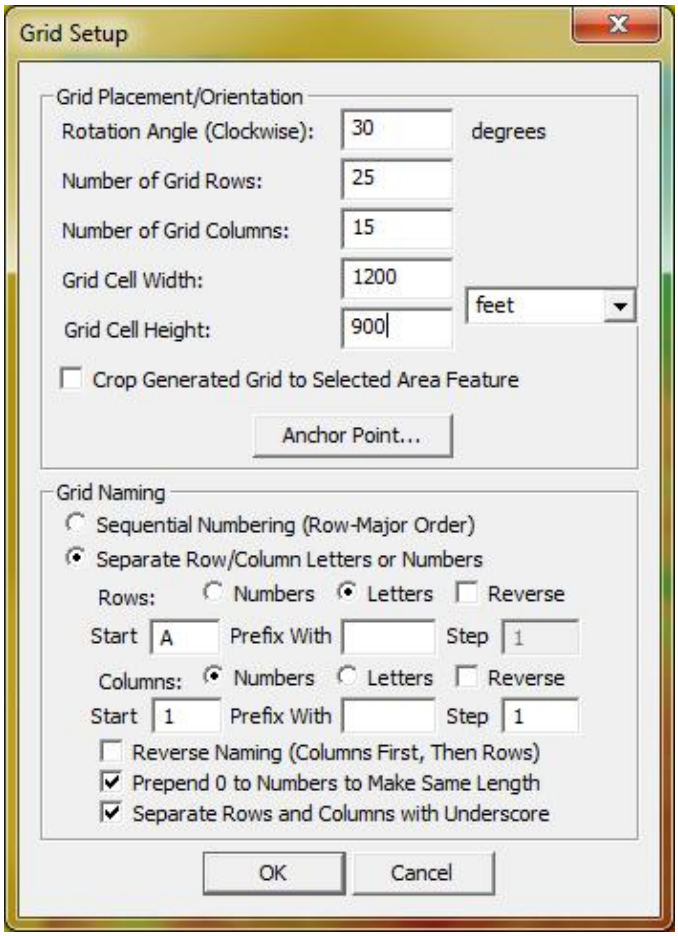
same parameters as the last strike-and-dip point that was created, allowing you to quickly place a lot of points without going through the dialog each time.


Enter Strike-and-Dip Parameters
Strike Azimuth
Specify the strike azimuth (direction) in degrees, where North is 0, East is 90, South is 180, and West is 270. The dip azimuth will be offset 90 degrees clockwise (right of) from the strike azimuth.
Azimuth
45°
degrees relative to
True North
Dip Value
20
Modify Location...
Symbol
Geology - Dip, Bedding (Medium, Black)
Description:
Rock Outcropping
Feature Layer
User Created and Modified Features
OK
Cancel

Create Regular Grid of Area Features of User-Specified Size/Orientation

After selecting the *Create Regular Grid of User Specified Size/Orientation* popup menu option, you can proceed to select the anchor point (top left corner) of your grid by left clicking at the desired location. You can cancel creation of the point(s) at any time by pressing the Escape key or right clicking.

After selecting the anchor point for your grid, the *Grid Setup* dialog (pictured below) appears and allows you to setup the size, count, naming, and orientation of your grid cells. Pressing the *Anchor Point* button allows you to edit the location of your anchor point.



Create Points Spaced Along Area and Line Features

You can create new point features evenly spaced along a selected area and line features by right clicking and selecting the Advanced Feature Creation submenu option *Create Point Features Spaced Along Selected Feature(s)*. This will present a dialog allowing you to specify the spacing to use, then create new point features at the specified interval along the line.

Editing Existing Features

In addition to creating new vector features, the Digitizer Tool is also very useful for editing existing vector features. This tool provides the ability to move, delete, and reshape vector features, as well as modify the label, classification, drawing style, and attribution of any vector feature loading from any file format supported by Global Mapper. Note than any edits made are NOT automatically saved back to the origin file, but they will be saved in Global Mapper workspaces and into any exported vector files.

Selecting Features

Before you can edit an existing feature or features, you first must select them. Once a feature is selected, you can tell that it is selected because it will be drawn with a different style. The different methods for actually selecting features are described below.

One way to select features is by simply by clicking the left mouse button near the feature, or in the case of area features, within the feature. Using this method, the closest point or line feature will be selected, or if no point or line features are nearby and you clicked within an area feature, the area feature will be selected.

To select multiple features at a time, you can drag a selection box by holding down the left mouse button to draw a box. Any features entirely within the box drawn or features which are cut by the box will be selected. If you hold down the 'I' key while dragging the box, only features and vertices that are completely within the box will be selected. This is useful for things like selecting a point feature that is on top of a line/area border.

You can add to an existing selection by holding down the CTRL key while performing a selection with any of the above described methods. You can deselect features by holding down the SHIFT key while performing a selection. You can toggle the selection state of features by holding down both the SHIFT and CTRL keys while performing a selection. As a final option, holding the 'P' key when clicking to select the feature may be used to select the topmost area feature at a location. This is useful for selecting area features that may be overlaid by a line or point feature. It's functionally equivalent to using the Vector Display tab of the Configuration dialog to enable only the "Select From Areas" option - a temporary selection filter.

If you are planning on moving lots of features, you can speed up the process by holding down the ALT key when selected features and/or vertices. Doing this will cause you to automatically put into move mode when selecting new features and/or vertices.

You can also select area, line, and point features within selected area features by first selecting one or more area features using the previously described methods, then right clicking and selecting the appropriate option under the *Advanced Selection Options* submenu. This makes it easy to find and edit all of the point, line, and/or area features within some other area feature(s).

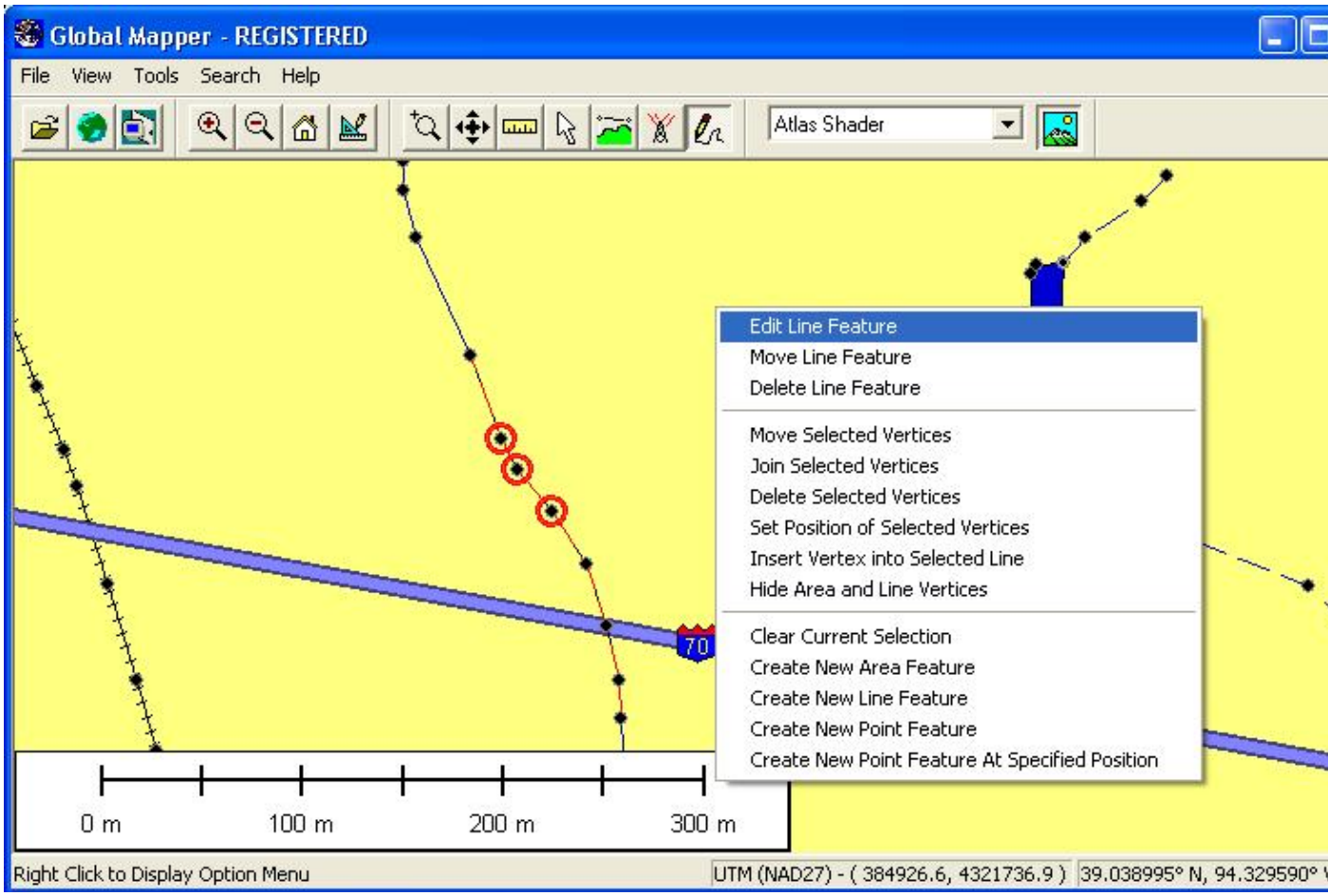
When working with island and parent areas, there are also some options available under the *Advanced Selection Options* submenu that make it easy to select all of the island areas associated with selected parent areas and to also deselect the parent area for a selected island area.

Selecting Vertices

If the *Show Area and Line Vertices* option is enabled (Shift+V is a keyboard shortcut to toggle this setting), you can also select individual vertices on area and line features. You must select vertices before options allowing you to work with individual vertices in area and line features appear in the right-click options menu. Selected vertices will be shown on the display with a circle around them.

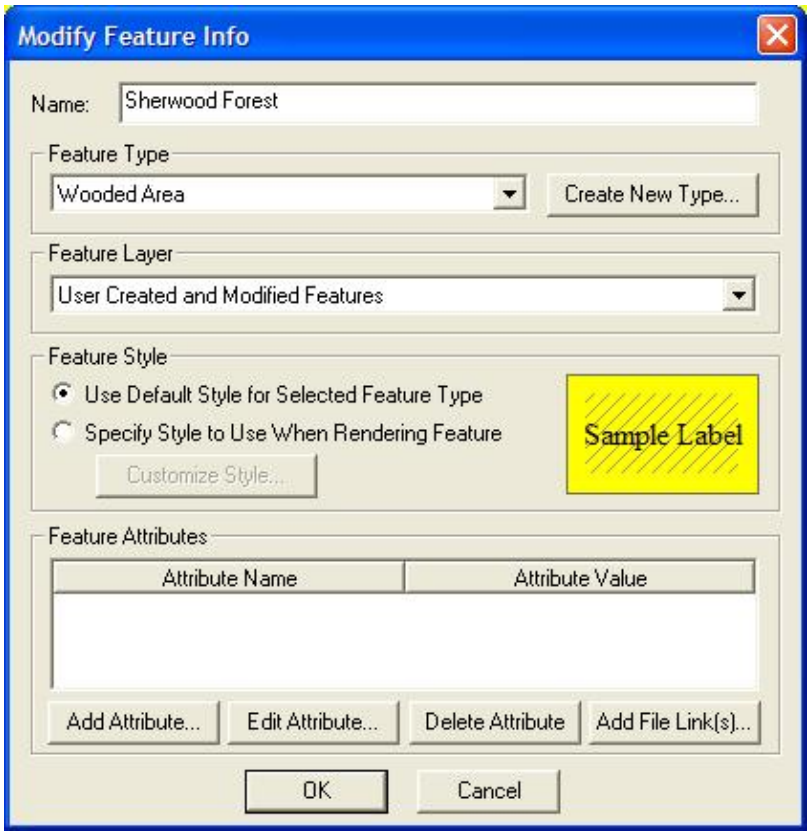
To select vertices, simple left click near a vertex to select the closest one if any are nearby, or drag a box to select all vertices within the box. The same behavior modifications occur as described above if the CTRL and/or SHIFT keys are pressed when selecting. If you hold down the 'S' key when left clicking, only vertices from already selected lines or areas will be considered.

Pictured below is a screen capture showing a line feature and several of its vertices selected, with a right-click popup menu opened to show the available options.



Editing Feature Attributes and Drawing Styles

When a single area, line, or point feature is selected, there is an option on the right-click popup menu allowing you to edit that feature (i.e. *Edit Area Feature*, *Edit Line Feature*, or *Edit Point Feature*). Selecting that option displays the Modify Feature Info dialog which allows you to modify the Name, Feature Type, Drawing Style, and Attributes for the selected feature. You can also access this dialog by double-clicking on a feature. A sample of this dialog for an area feature is below.



The *Name* field allows you to modify the display name of the feature. If you are editing or creating a road feature, you can set the name to a commonly supported iconized road name (like I-35 or US40) and when you press OK you will be prompted whether or not to display an icon for the road name. This allows you to generate a nice iconized display for most highway types. If you would like to split point and area labels up onto multiple display lines, you can add the newline escape sequence (\n) to your display label. You will then be prompted to split your label onto multiple lines when you save the changes.

If editing an area or line feature, the *Vertices* button will appear allowing you to edit the vertices of the selected feature, including working with per-vertex elevations for 3D features.

The *Feature Type* selection allows you to choose which Global Mapper classification to assign to the feature. You can also choose to create a new Global Mapper type with the *Create New Type* button.

The *Feature Layer* selection allows you to choose which layer that the feature should be assigned to. You can choose an existing layer, the User Created and Modified Features layer, or you can create an entirely new layer to add the feature to. A layer corresponds to a single entry in the Control Center.

The *Feature Style* section allows you to modify the drawing style of the selected feature. Selecting the *Use Default Style for Selected Feature Type* option will cause the currently configured style for the *Feature Type* from the Area, Line, or Point Styles tab of the Configuration dialog to be used when rendering the feature. Alternatively, you can choose the *Specify Style to Use When Rendering Feature* option and select how you want this feature drawn, independent of the selected *Feature Type*.

The *Feature Attributes* selection allows you to edit the attributes that are associated with this feature. The *Add File Link(s)...* button in this section allows you to easily add attributes that point to files somewhere on disk without having to manually type in the file name. These file links can later be followed from the Feature

Information dialog displayed with the Feature Info tool.

When more than one area, line, and/or point feature is selected, there is an option on the right-click popup menu allowing you to edit the selected features. Selecting that option displays a dialog dialog which allows you to modify the Name, Feature Type, Feature Layer, and Drawing Style, and Attributes for the selected features.

Deleting/Undeleting Features

Removing an unwanted feature is quite simple. All that you need to do is select the feature(s) that you wish to delete, then either select the Delete option from the right-click popup menu or press the DELETE key. Once you've done that, the feature is marked for deleted and will no longer appear on the display unless the *Render Deleted Features* option is enabled on the Vector Options tab of the Configuration dialog.

If you decide that you didn't want to delete a feature, simple enable the *Render Deleted Features* option (see above) to show the deleted features, then select the deleted features and select the *Undelete Feature(s)* option from the right-click popup menu.

Moving Features

You can move area, line, and point features simply by selecting the feature(s) that you wish to move, then selecting the *Move XXX Feature(s)* option from the right-click popup menu, or you can simply hold down the ALT key when selecting the feature(s) to move to automatically enter move mode for the selected feature(s)/vertices. Once you've done that, simply hold down the left mouse button and drag the features to the desired new location.

If you'd only like to move the selected feature(s) either horizontally or vertically, you can hold down either the 'X' or 'Y' keys on the keyboard to restrict the movement to that axis. Holding down both keys will move the feature(s) diagonally.

If after moving a feature you decide that you want to undo the move, simply select the feature(s) that you want moved back and select the *Restore Original Shape* from the right-click popup menu.

If you need to shift/offset selected features a particular distance, you can also simply right click when the feature(s) to move are selected and select the *Shift/Offset Selected Feature(s)* option. This will bring up a dialog allowing you to specify a distance to shift the selected features by in both the X and Y direction or some distance along a specified bearing. The bounding coordinates of the feature in the current projection/coordinate system will be displayed at the bottom of the dialog that appears to help you calculate an appropriate shift/offset distance.

Changing the Shape of Area and Line Features

You can change the shape of area and line features in several different ways. You'll first have to enable the *Show Area and Line Vertices* option (Shift+V is a keyboard shortcut to toggle this setting) before having access to the features described below. You'll also need to select the vertices to work with before performing any of the described operations except inserting new vertices.

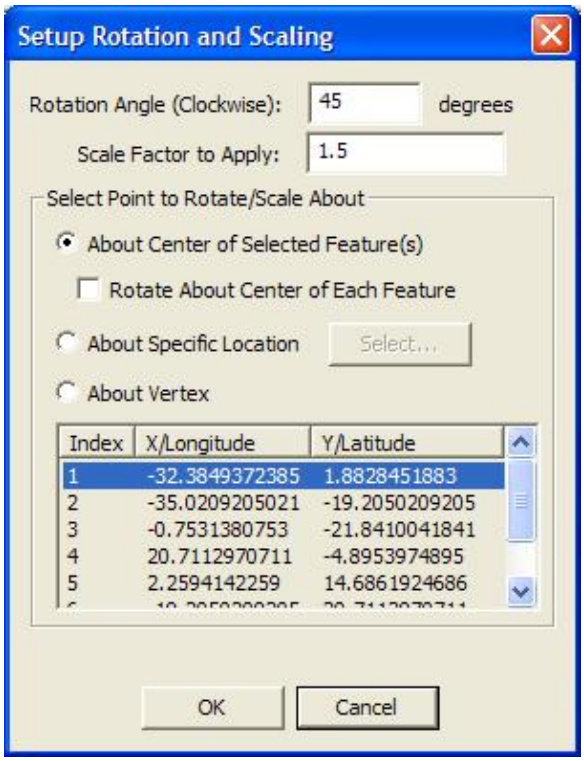
The following options are available for reshaping area and line features:

- Move Selected Vertices - This option allows you to move selected vertices to a new location. To do this, simply hold down the left mouse button and move the vertices to the desired location, then release the left mouse button. You can continually to refine the location by repeating. Right clicking or pressing the ESC key will complete the operation. Note that while moving a single vertex, you can use the *Snapping* feature to help align the vertex with existing features. If you'd only like to move the selected vertices either horizontally or vertically, you can hold down either the 'X' or 'Y' keys on the keyboard to restrict the movement to that axis. Holding down both keys will move the vertices diagonally.
- Join Selected Vertices - This option allows you to set multiple vertices to the same location, which is handy for ensuring that there are no gaps along the seams of features. Once you've selected this option, hold down the left mouse button and move the vertices to the new desired location, then release the left mouse button. Right click or press the ESC key to complete the operation once you're done. Note that while joining vertices, you can use the *Snapping* feature to help align the vertices with existing features.
- Deleted Selected Vertices - This option allows you to delete the selected vertices. To quickly do this without using the right-click menu, the CTRL+Delete hot key will also delete selected vertices.
- Set Position of Selected Vertices - This option displays a dialog allowing you to manually position the selected vertices by entering their new position in either latitude/longitude coordinates or coordinates in the currently configured view projection/datum. If the selected vertices are from a 3D line or area feature, you will also be able to set the elevation value to use for the vertex.
- Insert Vertex - This option allows you to insert a new vertex into the selected area or line feature. To insert the vertex, select the menu option, then left click at the location where you want the new vertex inserted. The vertex will be inserted on the area or line feature at the clicked location along the nearest segment of the feature. Alternately, if you hold down the SHIFT key while left-clicking the new vertex will be placed on the selected feature(s) at the nearest location to the click location. You can also use this feature to extend features. The newly created vertices will be automatically selected. If you need to add multiple vertices to the selected feature(s), simply hold down the 'I' key when left-clicking to place the vertex and you will remain in the insert vertex mode.
- Resample Selected Feature(s) at Specified Spacing - This option is found under the Advanced Feature Creation Options submenu and allows you to resample your selected area or line feature at a specified interval. This is useful if you want to add a lot of new vertices along your feature to make reprojection work better or to facilitate smoothing of the feature.
- Simplify (Reduce) Vertices of Selected Feature(s) - This option allows you to automatically remove vertices that do not significantly contribute to the shape of your selected area or line features. This is useful to significantly reduce the size of your features without giving up much detail in the shape. When selected you will be presented with an option to specify how different from a straight line a vertex has to be in order to be kept.
- Smooth Selected Line/Area Feature(s) - This option allows you to modify the position of the vertices of your selected line and area features to smooth the appearance. This can be useful on things like jagged contour lines to give them a better appearance.

If after modifying the shape of an area or line feature you decide that you want to undo the changes and restore the feature to its original shape, simply select the feature(s) that you want restored and select the *Restore Original Shape* from the right-click popup menu.

Rotating and Scaling Features

When you have one or more features selected, you can right click and select the *Rotate/Scale Selected Features* command to bring up the *Setup Rotation and Scaling* dialog (pictured below). This dialog will allow you to rotate and scale the selected features about a point that you select.



Combining Area and Line Features

You can combine overlapping or adjacent area features into a single area feature by first selecting the area features to combine, then selecting the *Combine Selected Area Features* right-click menu option. Any areas that are succesfully joined into a new one will be marked as deleted.

You can combine multiple line features into a single line feature by first selecting the line features to combine, then selecting the *Combine Selected Line Features* right-click menu option. This option will connect any lines that you have selected that join at an endpoint. Any lines that are succesfully joined into a new one will be marked as deleted.

When you select the option you will be allowed to setup options for the combine operation, including whether or not the attributes of the lines have to much to be combined, if the lines being joined have to fully close, and whether or not to create multiple areas if the selected lines don't all form a single path.

Finding the Intersection of Multiple Area Features

You can find the intersection of two area features by selecting both features, then right clicking and selecting the *Find Intersection of Selected Area Features* menu command. This operation will create a new area feature from the intersection of the two selected area features. You will also be prompted to create new area features from what is left outside of the intersection. If you choose this option then the original area features will be marked as deleted once the operation completes successfully.

Cutting Areas From/Adding Islands to Area Features

You can cut one area feature shape out of another area shape, either adjusting the second areas outer boundary or making the first area feature become an island, or hole, within the second area by first selecting the area(s) that you want to cut from another area/make into an island, then right click and select the *Cut Selected Area(s)*

from Another Area (Add Islands) menu option. You will then need to left-click in the area feature that you would like to cut the selected area(s) out of.

Splitting Areas into Two New Area Features

You can split an existing area feature into two new area features by selecting the two vertices across which you would like to split the area, then right clicking and selecting the *Split Selected Area at Selected Vertices* menu option. This will generate two new area features by splitting the selected area feature across the segment between the two selected vertices. Note in some situations you will get invalid areas or no result at all, so be careful to select vertices for which the connected segment does not cross outside of the area or intersect any island areas.

Cropping Line Features to Area Features

You can crop or split selected line features to a selected area feature by right-clicking and selecting the option to *Crop/Split Selected Lines to Selected Areas*. This will delete any portion of the line feature that lies outside of the selected areas unless you select the Split option, in which case separate lines will be created for the parts inside and outside the selected area feature(s). Note that the original line will remain available as a deleted feature, so you can recover the original line if needed.

Copying Features (Cut/Copy/Paste)

Occasionally you may wish to make copies of existing features or perhaps move features from one instance of Global Mapper to another. You can easily do this by first selecting the features, then either making a copy of those features (use Edit->Copy Selected Features to Clipboard menu command or Ctrl+C shortcut) or cutting those features to the clipboard (use Edit->Cut Selected Features to Clipboard menu command or Ctrl+X shortcut). Then, simply paste those features into any running instance of Global Mapper using either the Edit->Paste Features from Clipboard [Ctrl+V shortcut] or Edit->Paste Features from Clipboard (Keep Copy) [Ctrl+Shift+V shortcut], the latter of which keeps the features on the clipboard for additional pasting rather than wiping the clipboard clearn.

Snapping to Existing Features When Drawing

During some operations (i.e. drawing new area or line features or graphically placing a new point feature), the cursor can automatically snap to existing features when you move it near them to facilitate lining up features. This happens by default unless the ALT or V keys are depressed. Pressing the ALT key causes no automatic snapping to occur, while pressing the V key causes only vertices on existing features to be snapped to. Holding down the P key causes only nearby point features to be snapped to.

Note that you can reverse the automatic snapping behavior so that snapping is disabled by default and holding down the ALT key enables snapping on the Vector Display tab of the Configuration dialog.

ADVANCED USERS: You can customize the pixel radius used when looking for a location on existing features to snap to using the DWORD registry key 'HKEY_CURRENT_USER\Software\Global Mapper\SnapToPixelRadius'. The default value is 10 pixels. Just create that registry key and provide the distance (in pixels) to search from the cursor location for a location to snap to.

Snapping Vertically/Horizontally When Drawing

When drawing new area or line features or moving existing features, you can use the CTRL and SHIFT keys to cause the next vertex to be snapped vertically or horizontally relative to the last vertex or moved vertically or horiztonally compared to the features current location. Hold down the CTRL key to snap vertically, the SHIFT key to snap horizontally, or both the CTRL and SHIFT keys to snap diagonally.

Un-doing Digitization Operations

During some operations, like drawing new features, you can undo your last placed point by pressing Ctrl+Z.

Displaying Additional Feature Information

Depending on what types of feature are selected and what data is available, additional options may appear on the option menu that appears when right clicking. These additional options are described below.

Adding Elevation Values from Terrain to Features

If gridded elevation data (i.e. DEMs) is loaded and one or more features is selected, the *Apply Elevations from Terrain Layers to Selected Features* option will appear on the right-click option menu. Selecting this option will add an ELEVATION attribute to each selected point feature containing the elevation value at each point location from the top-most terrain layer at that location. Any selected line or area features that have a valid elevation from loaded terrain at each vertex location will have a set of per-vertex elevations added to the feature containing the elevation at each vertex from the loaded terrain layers.

Generating a 3D Path Profile from a Selected Line or Area Feature

If gridded elevation data (i.e. DEMs) is loaded, the *Generate Path Profile From Line* option will appear when a single line or area feature is selected. Selecting this option will display the Path Profile/Line of Sight dialog with a 3D path profile of the elevations under the path that the selected feature follows. In addition, if the selected line/area is a 3D feature with per-vertex elevations, those elevations will be displayed as a separate line on the path profile.

Calculating View Sheds at Multiple Point Locations If gridded elevation data (i.e. DEMs) is loaded, the *Calculate View Sheds at Selected Point(s)* option will appear when one or more point features are selected. Selecting this option will display the View Shed dialog allowing you to setup the parameters for performing a view shed calculation centered on each selected point feature location.

Calculating Elevation Statistics within Selected Area/Line Features

If gridded elevation data (i.e. DEMs) is loaded and at least one area or line feature is selected, the *Calculate Elevation/Slope Stats for Selected Area/Line(s)...* option will appear when right clicking. Selecting this option will examine the loaded terrain within the selected area feature(s) and, if terrain is found within a selected area, add MIN_ELEV, MAX_ELEV, AVG_ELEV, STD_DEV_ELEV, MAX_SLOPE, AVG_SLOPE, and STD_DEV_SLOPE attributes to the area containing the minimum, maximum, average, and standard deviation of elevation values encountered within the area feature as well as the maximum, average, and standard deviation of the slope values (in degrees) found within the area. For selected line features, the maximum and average slope (in degrees), the total elevation gain and loss along the path, and the maximum slope both up and down the line (assuming travel from the start of the line to the end) for the line will be computed and added as MAX_SLOPE, MAX_UP_SLOPE, MAX_DOWN_SLOPE, AVG_SLOPE, ELEV_GAIN, and ELEV_LOSS attributes.

Calculating Cut-and-Fill Volumes for Area and Line Features

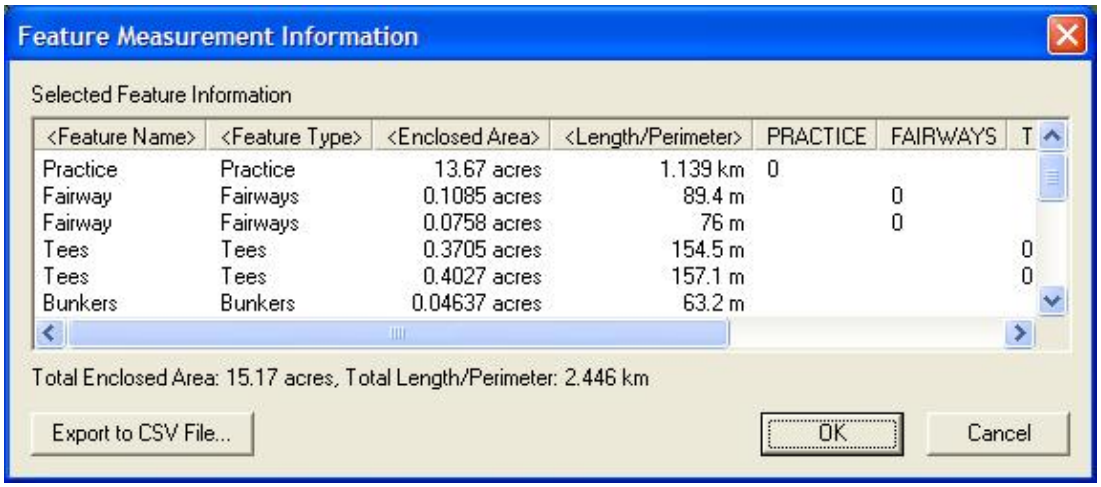
If you have a single area or line feature selected, the *Measure Volume* option will appear when bringing up the right-click menu. Selecting this option will allow you to calculate cut-and-fill volumes either within the selected area or along the selected line feature. For more information about this operation, see the cut-and-fill section of the Measure Tool help. If you have multiple area features selected you can also calculate the combined cut-and-fill volume of all of the selected area features.

Working with Feature Measurements (i.e. Length, Enclosed Area)

If one or more area and/or line features are selected, the *Add/Update the Measure Attributes of Selected Feature(s)* option will appear when right clicking. Selecting this option will add measurement attributes to the selected features that do not already have them, or update the measurement attributes of features that do. The measure attributes include LENGTH for lines and PERIMETER and ENCLOSED_AREA for areas.

In addition to adding/updating the measure attributes for the selected feature(s), the combined length and/or enclosed area of the selected line and area features will also be reported by this command.

You can also select the *Display Feature Measurements* option to display a dialog (pictured below) listed the measurements and attributes of each selected line and area feature as well as the total combined enclosed area and perimeter/length of the features. This dialog also allows you to easily export the results to a CSV file.



Automatically Inserting Vertices at Line Intersections

If two of more line features are selected, the *Insert Vertices at Intersections of Selected Features* option will appear when right-clicking. Selecting this option will find all intersections between selected line features and insert new vertices in the selected lines at the intersection locations if there are not already vertices at the intersection. Once the operation is complete you will also be prompted as to whether or not you want to split the selected lines at the locations where intersections were found.

This is a very powerful command allowing you to make a line network have node-to-node connectivity and even make sure that lines terminate at intersections if required for your application. This is commonly used for making routable street maps.

Finding Non-Connected Line Endpoints (i.e. Connectivity Checks)

If two of more line features are selected, the *Find Non-Connected Line Endpoints* option will appear when right-clicking. Selecting this will display a dialog allowing you to either mark all line endpoints that do not connect to an endpoint (not an interior vertex) of another selected line or those line endpoints that don't connect and are within some distance of another selected line endpoint. This is a very useful feature for allowing easy identification and fixing of connectivity issues within loaded vector data.

Any line endpoints that do not connect based on the selected criteria will be displayed with a blue circle over that endpoint. Once you think you have fixed the connectivity issues at a location, simply re-run the command to find the non-connected line endpoints to update the display of the blue circles (they are not automatically updated as you join line endpoints).

Finding Nearby Points

If two of more point features are selected, the *Find Selected Points Within ??? Meters of Other Selected Points* option will appear when right-clicking. Selecting this will display a dialog allowing you to specify a search distance. Any selected point features that are within the specified search distance of another selected point feature will be displayed with a blue circle over that point. If you delete or move some points to remove duplicates (the primary use of this tool), simply re-run the command to find the to update the display of the blue circles (they are not automatically updated as you edit the data).

Flattening Terrain Using Area Features

If one or more area features are selected, the *Advanced Feature Creation Options->Create/Flatten Terrain from Selected Area Feature(s)* option will appear when right-clicking. Selecting this option will allow you to create a new elevation grid covering the selected area features that has all points within the selected area feature(s) set to the elevation of those area features. Any portions of the new elevation grid outside of the area features will be set to invalid, allowing any underlying terrain to show through. If you also select the option that elevations are relative to the height of any underlying terrain, the new terrain surface will have heights equal to the original height of the terrain at each sample location within the area offset by the elevation value of the area feature. This functionality is useful for adjusting all elevation values within an area by some amount (the area elevation).

This feature provides a very easy way to do things like flatten an area, like a lake, in underlying terrain layers. Just assign an ELEVATION attribute to your area feature, then select it and choose this option to flatten everything inside that area to the elevation attribute value. This is also a nice way to create an elevation grid representing a city-scape from building outlines with ELEVATION attributes.

Adding Address Information to Points from Nearby Road Features

If one or more point features are selected, the *Add Address Information from Roads to Selected Point(s)* option will appear when right-clicking. Selecting this option will cause each point to be examined to find the nearest line feature, and, if it contains addressing information, for the address of the nearest point on the line to the point feature to be stored as address attributes with the point feature. A dialog will appear to prompt you for how far from each point that you want to search for a line feature with addressing information.

The following attribute names for line features are recognized as containing address information:

- FR_ADDR_R, R_FROM_ADR - starting address number on the right side of the road
- FR_ADDR_L, L_FROM_ADR - starting address number on the left side of the road
- TO_ADDR_R, R_TO_ADR - ending address number on the right side of the road

- TO_ADDR_L, L_TO_ADR - ending address number on the left side of the road
- PLACE_R, R_CITY - city or town on the right side of the road
- PLACE_L, L_CITY - city or town on the left side of the road
- STATE_R, R_STATE - state or province on the right side of the road
- STATE_L, L_STATE - state or province on the left side of the road
- ZIP_R, R_ZIP, R_PCODE - postal code on right side of road
- ZIP_L, L_ZIP, L_PCODE - postal code on left side of road
- COUNTRY_R, R_COUNTRY - country on right side of the road
- COUNTRY_L, L_COUNTRY - country on left side of the road
- PARITY_R, R_PARITY - numeric parity value on right side of road. A value of 1 means odd parity (addresses are all odd), a value of 2 means even parity (address are all even), and a value of 3 means there is not parity (addresses can be even and odd). For any other value the parity will be automatically determined.
- PARITY_L, L_PARITY - numeric parity value on left side of road. A value of 1 means odd parity (addresses are all odd), a value of 2 means even parity (address are all even), and a value of 3 means there is not parity (addresses can be even and odd). For any other value the parity will be automatically determined.

Only the start and end address number are absolutely required for the side of a road to have addressing, in addition to the road having a name.

Adding Coordinate Attributes to Point Features

If one or more point features are selected, the *Add Coordinate Attributes to Selected Point(s)* option will appear when right-clicking. Selecting this option will cause X and Y attributes to be added (or updated if they already exist) to the selected points with the value being the coordinates of the points in the current projection system.

Adding Attributes to Features from Other Features

There are multiple ways to assign attributes to features from other features. This includes, applying attributes to areas from points in those areas, applying attributes to points from the area they are in, and applying attributes to lines from area features they are in. Each of these options is further described below.

If one or more area features are selected, the *Add Attributes to Selected Areas from Points* option will appear when right-clicking. Selecting this option will cause Global Mapper to search for any point features within each area and, if found, add the attributes from the included point feature to the area's attribute list. If multiple points are found within the area the user is prompted whether or not to use the attribute data.

If one or more point features are selected, the *Add Attributes to Selected Points from Areas* option will appear when right-clicking. Selecting this option will cause Global Mapper to search for the top-most area feature with attributes that each point feature is in and, if found, add the attributes from that area to the point's attribute list.

If one or more line features are selected, the *Add Attributes to Selected Lines from Areas* option will appear when right-clicking. Selecting this option will cause Global Mapper to search for the top-most area feature with attributes that each line feature is in and, if found, add the attributes from that area to the line's attribute list.

Counting Features Contained within Area Features

If one or more area features are selected, the *Add Attributes with Count of Points and Lines in Selected Area(s)...* option will appear in the right-click menu. Selecting this option will count the number of point and line features completely contained within each selected area and add the counts for each area to the attribute list for the area as LINE_COUNT and POINT_COUNT attributes. This can be handy for doing something like counting all of the points within the loaded areas, then setting up the drawing style for the areas based on the new POINT_COUNT attribute on the Area Styles tab of the Options dialog for the layer that the areas are in, so you can color based on how many points were in each area.

Converting Areas with Islands to Single Vertex List

If one or more area features with separate islands/holes within them are selected, the *Create Single Vertex List Area From Selected Area(s) With Islands* option will appear in the *Advanced Feature Creation* sub-menu or the right-click menu. When selected, this option will connect all of the islands/holes within the selected parent areas into a single vertex list and replace the original parent/island area with a new area that contains just that single vertex list. This is useful for converting areas with islands into a form that software that cannot handle areas with holes can make use of.

GPS Menu

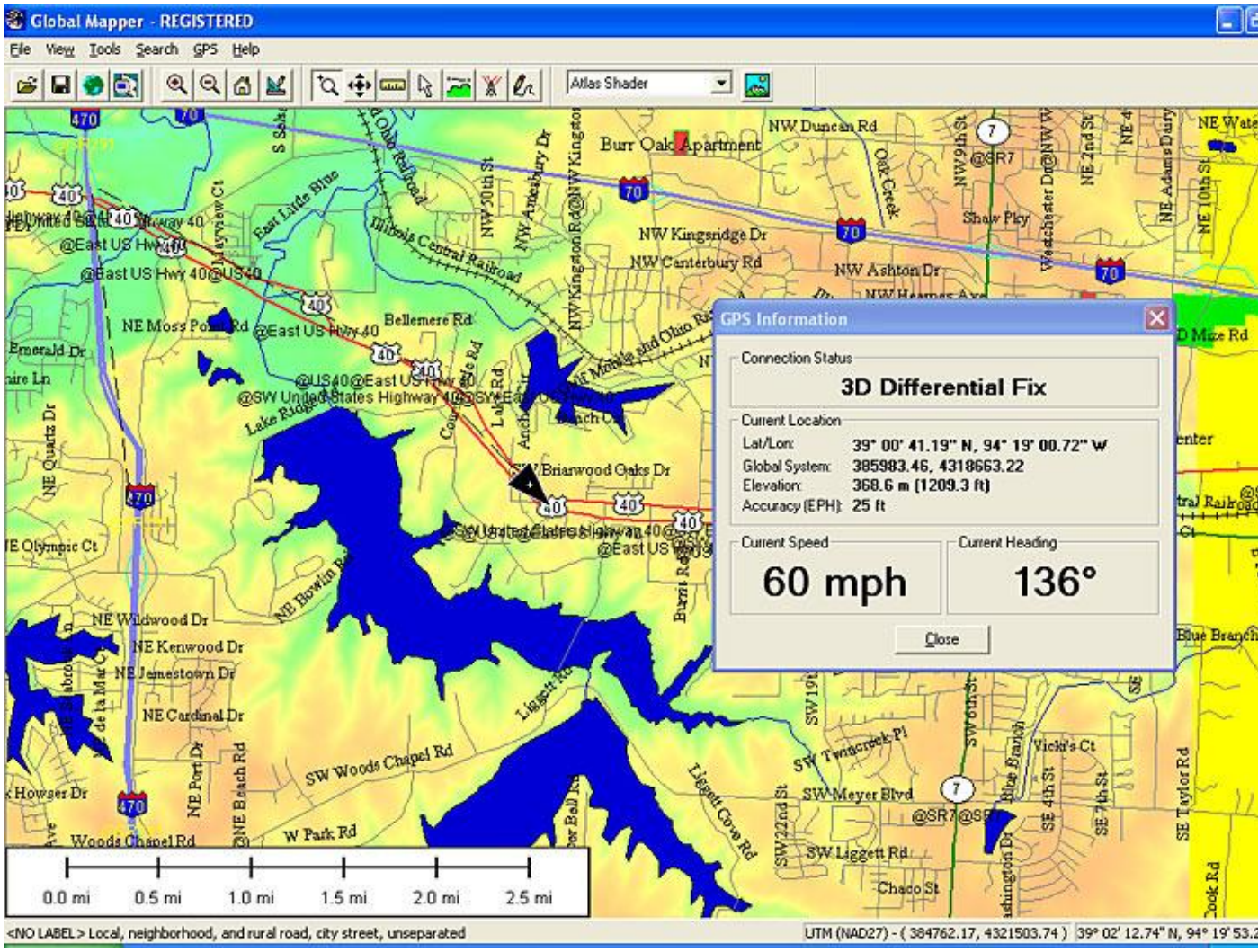
The *GPS Menu* offers the following commands:

- Start Tracking GPS
- Stop Tracking GPS
- Keep the Vessel On-Screen
- Mark Waypoint
- Vessel Color
- Vessel Size
- Vessel Shape
- Setup...
- Information...
- Manage GPS Vessels...
- View NMEA Data Log...
- Clear Tracklog
- Record Tracklog
- Save Tracklog
- Simplify (Reduce) Tracklogs when Saved
- Send Raster Maps to Connected Garmin Device

Global Mapper provides the ability to track the position of a serial GPS device connected to your computer's serial port (or USB via a serial-to-USB convertor) or a Garmin USB GPS device connected to your computer's USB port in real-time over the top of any loaded mapping data. For serial GPS devices, the GPS device must communicate in either NMEA-0183 v2.x or Garmin binary format in order to be compatible with Global Mapper.

When tracking a GPS device, you can mark the current location as a waypoint. You can also choose to record a bread-crumb trail, or tracklog, of where you have gone.

Below is a sample screen capture of what Global Mapper looks like when tracking a GPS device over loaded data. In the sample, 30-m SDTS DEM data is loaded as a backdrop with Tiger 2002 data loaded on top. You can see the GPS vessel location and the tracklog of where the vessel has been. The GPS Information dialog displays current GPS status information.


Global Mapper - REGISTERED
File View Tools Search GPS Help
Atlas Shader
GPS Information
Connection Status
3D Differential Fix
Current Location
Lat/Lon: 39° 00' 41.19" N, 94° 19' 00.72" W
Global System: 385983.46, 4318663.22
Elevation: 368.6 m (1209.3 ft)
Accuracy (EPH): 25 ft
Current Speed
60 mph
Current Heading
136°
Close
0.0 mi 0.5 mi 1.0 mi 1.5 mi 2.0 mi 2.5 mi
<NO LABEL> Local, neighborhood, and rural road, city street, unseparated
UTM (NAD27) - (384762.17, 4321503.74)

Start Tracking GPS

The *Start Tracking GPS* option causes Global Mapper to look for a GPS device attached on the configured serial port (see the Setup command) and to start displaying the location of the GPS device, if found, in the Global Mapper display window.

If a GPS device is found which has a valid GPS fix, you will see a triangular vessel appear in the Global Mapper view at the location reported by the GPS device. The vessel will point in the current direction of travel, as reported by the GPS device.

Stop Tracking GPS

The *Stop Tracking GPS* command tells Global Mapper to stop tracking any connected GPS devices.

Keep the Vessel On-Screen

If the *Keep the Vessel On-Screen* option is checked, the main view will automatically pan when the GPS vessel approaches the edge of the view to keep the vessel in the view.

Mark Waypoint

Use the *Mark Waypoint* or *Mark Waypoint from Averaged Position*command to save a point feature at the current GPS location. When selected, this command will display a dialog allowing you to specify any additional desired attributes and/or drawing styles that you would like to associate with the waypoint.

If you select the Averaged Position option, Global Mapper will start averaging locations received until you choose to stop averaging, at which point you will be presented with the dialog described above. Averaging is useful if you need a very accurate position for your waypoint.

Any created waypoint features will be added to the user features layer, which appears in the Overlay Control Center. The waypoint features can be exported to any of the supported vector export formats.

Vessel Color

The *Vessel Color* command allows you to control what color the GPS vessel is displayed in.

Vessel Size

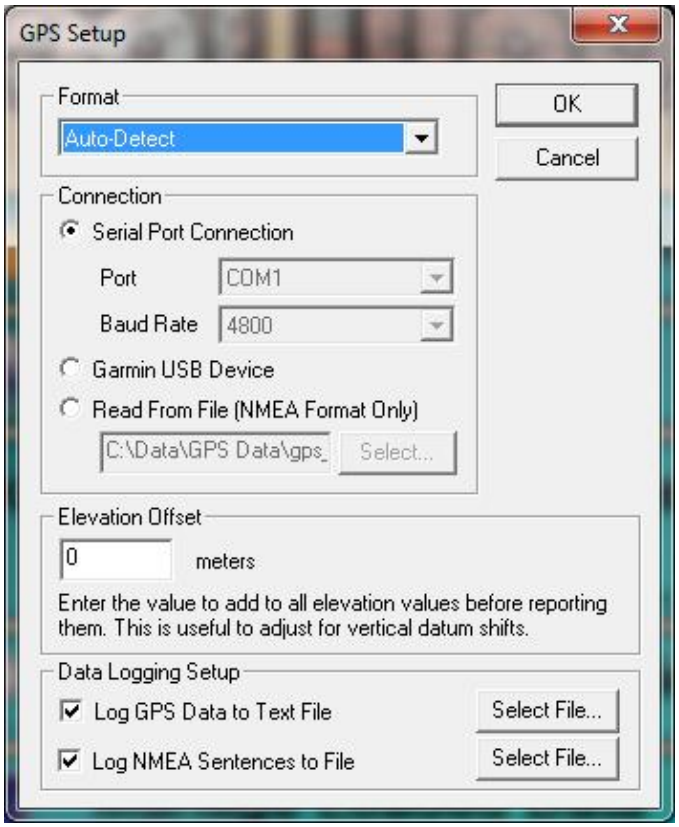
The *Vessel Size* submenu options allow you to control how large you would like the GPS vessel to be on screen.

Vessel Shape

The *Vessel Shape* submenu options allow you to control the shape of the GPS vessel on screen.

Setup...

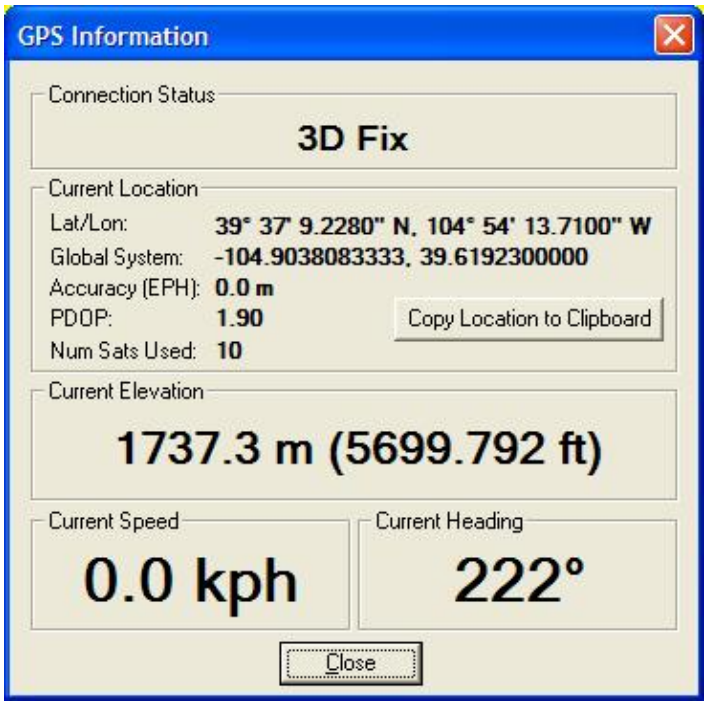
The *Setup* command displays the *GPS Setup* dialog (pictured below). The *GPS Setup* dialog allows you to tell Global Mapper what port your GPS device is connected to your computer on and what format the GPS device is communicating in. Make sure that you have your GPS device set to NMEA-0183 v2.x or Garmin mode. There is also an Auto-Detect option which will cause Global Mapper to try and automatically determine your GPS device's settings when you start tracking the device. You can also specify that you would like to read GPS information from a text file containing NMEA-0183 sentences. The *Data Logging* section allows you to setup logging of the incoming GPS information to new text files. You can choose to log decoded position information (including latitude and longitude, elevation/depth, speed, heading, and time) in addition to raw NMEA data strings for connected NMEA GPS devices.



ADVANCED USERS ONLY: By default GPS serial connections use 8-bit, no parity, and 1 stop bit (8N1), but if you have one of the rare units that uses 7-bit rather than 8-bit data streams, there is a way to set that. You need to run 'regedit' and create a DWORD key named 'HKEY_CURRENT_USER\Software\Global Mapper\GPS_ByteSize' with a value of 7 (do this with Global Mapper closed), then your serial connections will use 7-bit mode rather than 8-bit mode.

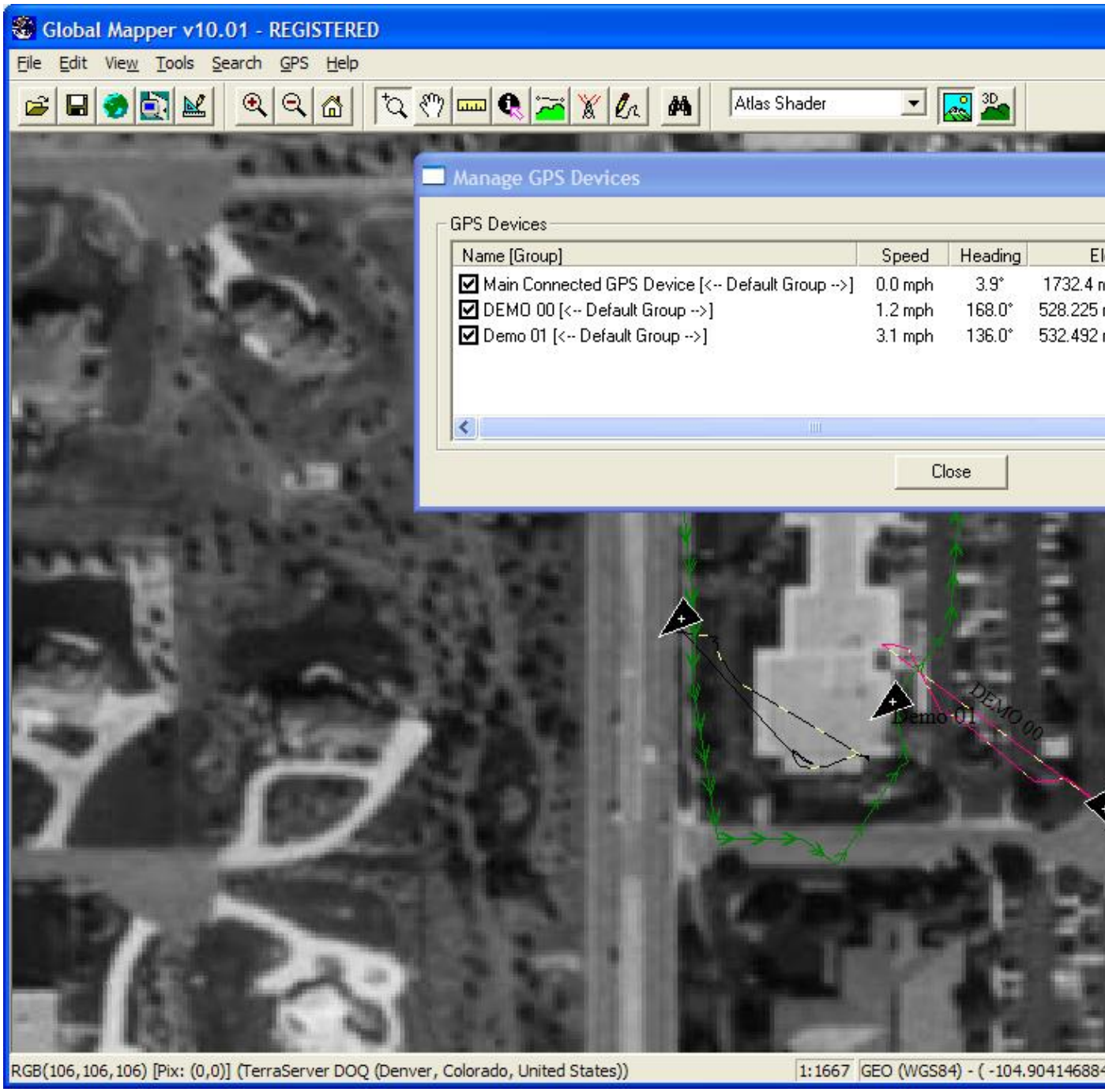
Information...

If you are currently tracking a GPS device, the *Information* command will display the *GPS Information* dialog (pictured below). This dialog displays status information about the current GPS connection, as well as the current GPS location (in both lat/lon and the current global coordinate sytem), speed, heading, and accuracy estimate.



Manage GPS Vessels

The *Manage GPS Vessels* command will display the *Manage GPS Devices* dialog (pictured below). This dialog displays a list of all GPS devices that are currently being tracked and provides the ability to modify several settings related to the GPS devices, such as device icon and track style, allowed boundary, etc. This dialog can be considered the central command center for fleet management operations when tracking multiple GPS devices through a compatible receiver, such as the RavTrack GPS Transponders from RaveonTech.



The dialog buttons perform the following functions:

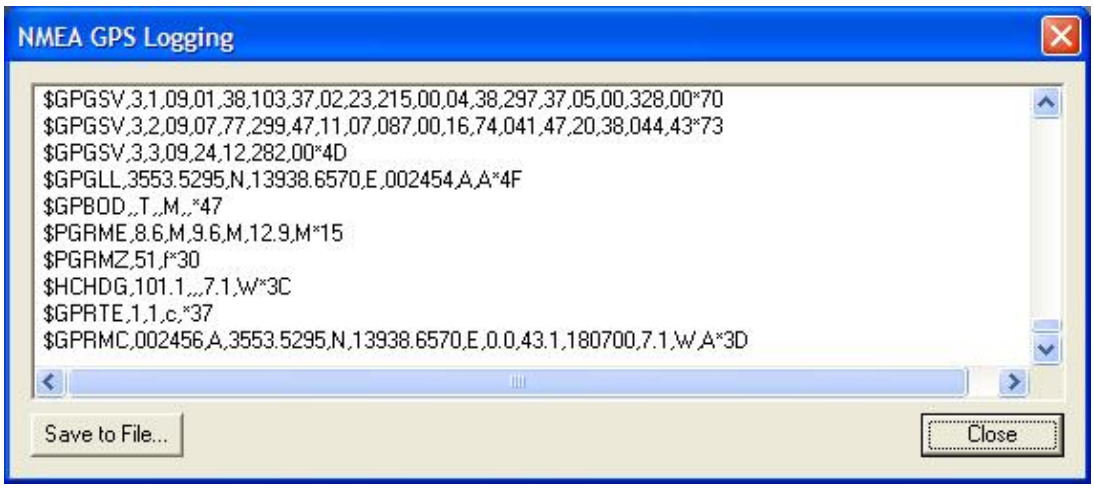
- Set Track Display Style - Allows you to select the drawing style to use when displaying the track log for the selected device.
- Select Device Icon - Allows you to select the what icon to use for the selected device on the main map display. You can choose from one of the available point symbols or choose to use the GPS vessel selection, which allows for direction of travel to be easily visualized.
- Set Device Boundary - Allows you to select a rectangular or polygonal boundary to restrict the selected GPS device(s) to. If a device travels outside its allowed boundary, a warning message will be

displayed.
- Set Device Display Name - Sets the name to use for the selected GPS device when displaying it on the map display and in the device list.
- Set Device Display Font - Allows you to select the font to use when displaying the name of the selected device on the map.

You can also right-click on the device list to get additional options, including the ability to set text to display when hovering over the device with the mouse cursor on the map, as well as the ability to group the devices and set styles by group.

View NMEA Data Log

The *View NMEA Data Log* command will display the *NMEA GPS Logging* dialog (pictured below). This dialog displays a list of recently received NMEA sentences when tracking a connected GPS device in NMEA mode. This is a useful diagnostic tool and also allows you to save received NMEA data to a file for later playback.



Clear Tracklog

If you are currently recording a tracklog of where your GPS device has been, the *Clear Tracklog* command will clear whatever is currently recorded that has not yet been saved using the *Save Tracklog* command.

Record Tracklog

The *Record Tracklog* command controls whether or not a bread-crumb trail (i.e. tracklog) will be recorded to log where the GPS device has traveled. This tracklog can be saved to any of the supported vector export formats. The drawing style of the tracklog can be configured on the Line Styles tab of the Configuration dialog.

Save Tracklog

The *Save Tracklog* command will save the currently record tracklog to a permanent line feature. When selected, this command will display a dialog allowing you to specify any additional desired attributes and/or drawing styles that you would like to associate with the tracklog. In addition, any extraneous points that do not contribute to the shape of the tracklog will be automatically removed to save space.

Any saved tracklog features will be added to the user features layer, which appears in the Overlay Control Center. The saved tracklog features can be exported to any of the supported vector export formats.

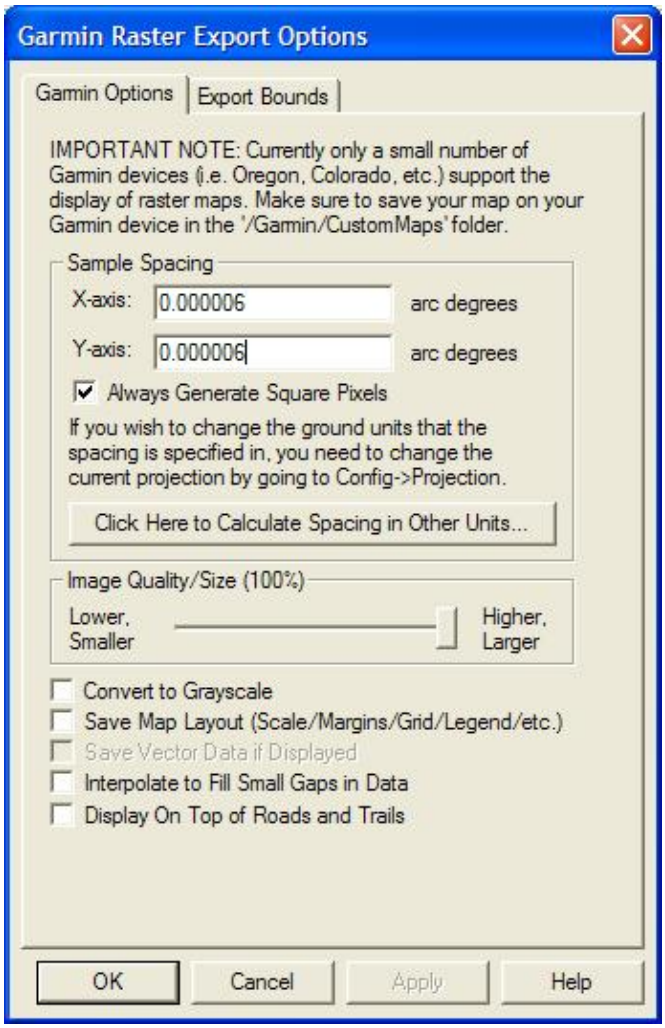
Simplify (Reduce) Tracklogs when Saved

The *Simplify (Reduce) Tracklogs when Saved* command controls whether or not recording GPS track logs are simplified (reduced) when saved or whether all recorded points are kept. If this option is checked, any points which do not significantly contribute to the shape of the recorded track log will be removed to conserve memory.

Send Raster Maps to Connected Garmin Device

The *Send Raster Maps to Connected Garmin Device* is a very powerful option that allows you to send any type of loaded data to a connected Garmin device for display as raster maps on your handheld Garmin device. Currently only a few Garmin GPS devices geared towards outdoor use, like the Colorado and Oregon series with updated software, support the display of custom raster maps, although it is likely in the future additional Garmin devices will support this type of display.

When you select the menu command, the *Garmin Raster Export Options* dialog (pictured below) is displayed allowing you to configure the export. You can control the resolution (sample spacing) of the export, the quality setting for the JPG files that are embedded in the output files for display on the GPS device, and several other options.


Garmin Raster Export Options
Garmin Options
Export Bounds
IMPORTANT NOTE: Currently only a small number of Garmin devices (i.e. Oregon, Colorado, etc.) support the display of raster maps. Make sure to save your map on your Garmin device in the '/Garmin/CustomMaps' folder.
Sample Spacing
X-axis: 0.000006 arc degrees
Y-axis: 0.000006 arc degrees
Always Generate Square Pixels
If you wish to change the ground units that the spacing is specified in, you need to change the current projection by going to Config->Projection.
Click Here to Calculate Spacing in Other Units...
Image Quality/Size (100%)
Lower, Smaller
Higher, Larger
Convert to Grayscale
Save Map Layout (Scale/Margins/Grid/Legend/etc.)
Save Vector Data if Displayed
Interpolate to Fill Small Gaps in Data
Display On Top of Roads and Trails
OK
Cancel
Apply
Help

Click to see a discussion thread that includes several screenshots with custom maps displayed on Garmin devices.

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General Overview

Global Mapper script files allow the user to create custom batch processes that make use of the functionality built in to *Global Mapper*. From a script, one can import data in any of the numerous formats supported by the software, reproject that data if desired, and export it to a new file.

Global Mapper script files consist of a series of command lines. Each command line begins with a command. A series of parameter/value pairs should follow the command. These pairs should be written as parameter=value. No spaces should exist before or after the equal sign. Individual parameter/value pairs should be separated by spaces. If a pair requires spaces internal to the value, quotes may be used around the entire value. For example, for a filename with spaces, the pair could look like FILENAME="c:\\my documents\\test.tif".

Command lines typically consist of one line each. To extend a command to another line, use the backslash character (\) at the end of the line. There are a few exceptions to this, including the DEFINE_PROJ and DEFINE_SHAPE commands and the looping functionality provided by the DIR_LOOP_START and DIR_LOOP_END commands.

Batch Mode Operation

You can run a Global Mapper script file automatically be passing it on the command line to the Global Mapper .exe file. The script file will be run with no user interface displayed and Global Mapper will immediately exit when the script file completes processing. This allows you to easily run Global Mapper scripts from another application or from a DOS batch file. Note that your script files need to have an extension of .gms for this to work.

Comments

Any lines that begin with the forward slash character (/) are considered comments and are ignored by the script processing engine. This means that you can use C or C++ style comments like // or /* at the start of your line.

ADD_MEASURE_ATTRS

The ADD_MEASURE_ATTRS command allows you to add/update feature measure attributes to all of the line and area features in a loaded vector layer.

The following parameters are supported by the command:

- FILENAME - filename of the layer to update. If an empty value is passed in, all layers that were created by the script, such as those from a GENERATE_CONTOURS command, will be updated. You can also pass in the value 'USER CREATED FEATURES' when running a script in the context of the main map view or loading a workspace to have the 'User Created Features' layer updated.

COMBINE_LINES

The COMBINE_LINES command allows you to combine connected lines features based on one or more attribute or label values. You can choose to combines in just a single loaded layer or in all loaded vector laeyrs. The newly created lines will be placed in a new layer and have the current projection. Any lines that are connected to another line will be marked as deleted. You can also supply multiple COMPARE_STR parameters to apply multiple criteria, all of which must be true, in order for the lines to be considering for combining.

The following parameters are supported by the command:

- FILENAME - filename of the layer to assign types to. If an empty value is passed in, all loaded vector layers will be updated. You can also pass in the value 'USER CREATED FEATURES' when running a script in the context of the main map view or loading a workspace to have the 'User Created Features' layer updated.
- COMPARE_STR - specifies a comparison operation to perform to see if a line feature is one that needs to be considered. The format is attr_name=attr_value. For example if you have an attribute named CFCC and you want to match when the value of that attribute starts with an 'A', you can use COMPARE_STR="CFCC=A*" as your parameter. You can add multiple COMPARE_STR parameters to a single command to combine multiple criteria for your search. If you would like to compare against a feature label rather than an attribute, use <Feature Name> for your attribute name. To compare against a feature type name rather than an attribute, use <Feature Type> for your attribute name. To compare against the feature description, use <Feature Desc> for your attribute name.
- CASE_SENSITIVE - specifies whether or not text comparisons are case sensitive or not. Use CASE_SENSITIVE=YES to enable, by default comparisons are not case sensitive.
- LAYER_DESC - specifies the name to assign to the newly generated layer containing the connected line features. If no layer description is provided, the default name of "Combined Lines" will be used.
- COMPATIBLE_ONLY - specifies whether or not any connecting lines should be combined (the default) or just those which have compatible types and attributes. Use COMPATIBLE_ONLY=YES to enable combining only compatible lines.

COMBINE_TERRAIN

The COMBINE_TERRAIN command generates a new terrain (gridded elevation) layer by combining two loaded terrain layers through some operation, like addition, subtraction (difference), average, min/max, etc. The new terrain layer can then be operated on just like any other terrain layer.

The following parameters are used by the COMBINE_TERRAIN command:

- LAYER1_FILENAME - full path and filename of the first loaded terrain layer to use. You can also pass in the full description of the loaded layer to use in case you want to use a layer not loaded from a file.
- LAYER2_FILENAME - full path and filename of the second loaded terrain layer to use. You can also pass in the full description of the loaded layer to use in case you want to use a layer not loaded from a file.
- COMBINE_OP - defines the operation to perform when combining the layers. The following operations are supported:
    - ADD - adds the values from the first layer to the second
    - SUBTRACT_SIGNED - subtracts the values of the second layer from the first and saves the signed result.
    - SUBTRACT_UNSIGNED - subtracts the values of the second layer from the first and saves the magnitude of the result.
    - AVERAGE - saves the average of the values from the first and second layers.
    - MINIMUM - saves the smaller of the values from the first and second layers.
    - MAXIMUM - saves the larger of the values from the first and second layers.
    - MULTIPLY - multiplies the values from the first and second layers. If one or both of the values is missing, the sample is marked as invalid.
    - DIVIDE - divides the value from the first layer by the value in the second layer. If one or both of the values is missing or if the second value is 0, the sample is marked as invalid.
    - FILTER_KEEP_FIRST - saves the first layer value if the second layer value is valid.
    - FILTER_KEEP_FIRST_IF_GT_SECOND - saves the first layer value if the second layer value is valid and the first layer value is greater than the second layer value.
    - FILTER_KEEP_FIRST_IF_LT_SECOND - saves the first layer value if the second layer value is valid and the first layer value is less than the second layer value.
- LAYER_DESC - specifies the name to assign to the newly generated terrain layer. If no layer description is provided, the default name of "Combined Elevation Grid" will be used.
- ELEV_UNITS - specify elevation units to use in new terrain layer
    - FEET - export in US feet
    - DECIFEET - export in 10ths of US feet
    - METERS - export in meters
    - DECIMETERS - export in 10ths of meters
    - CENTIMETERS - export in centimeters
- SPATIAL_RES - specifies spatial resolution. Defaults to the minimum spatial resolution of the two layers if not specified. Should be formatted as x_resolution,y_resolution. The units are the units of the current global projection. For example, if UTM was the current global projection and you wanted to export at 30 meter spacing, the parameter/value pair would look like SPATIAL_RES=30.0,30.0.
- SPATIAL_RES_METERS - specifies spatial resolution to use in meters. The value in meters will automatically be converted to the curent view/export projection units. For example, to do an export at 2.0 meter spacing (or as close as you can get to that in the current units), use SPATIAL_RES_METERS=2.0, or to do an export at 1.0 meters in X by 1.5 meters in Y, use SPATIAL_RES_METERS="1.0,1.5".
- GLOBAL_BOUNDS - specifies the combine bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, maximum x, maximum y.
- GLOBAL_BOUNDS_SIZE - specifies the combine bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, width in x, width in y.
- LAT_LON_BOUNDS - specifies the combine bounds in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.

- LAYER_BOUNDS - specifies that the operation should use the bounds of the loaded layer(s) with the given filename. For example, to export to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.
- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.
- FILL_GAPS - specifies that small gaps in between and within the data sets being combined will be filled in by interpolating the surrounding data to come up with an elevation for the point in question. This option is off by default, specify FILL_GAPS=NO to turn off.
- POLYGON_CROP_FILE - specifies the full path and filename of a vector file containing a polygon feature to which the operation should be cropped. If multiple polygons are found in the specified file the polygon which has the largest intersection with the data to be combined will be used as the crop polygon (see POLYGON_CROP_USE_ALL or POLYGON_CROP_USE_EACH for exceptions).
- POLYGON_CROP_NAME - specifies the name of a polygon shape previously defined using the DEFINE_SHAPE command to which the export should be cropped. The coordinates in the shape need to have been provided in whatever projection the new terrain layer will be in (i.e. the current projection).
- POLYGON_CROP_USE_ALL - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the operation will be cropped to all polygons in that file rather than just the best-fit polygon.
- POLYGON_CROP_USE_EACH - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the operation will generate a separate export for each polygons in that file rather than just the best-fit polygon. See the POLYGON_CROP_BBOX_ONLY and POLYGON_CROP_NAME_ATTR options for naming and other options when using this parameter. Use POLYGON_CROP_USE_EACH=YES to enable.
- POLYGON_CROP_BBOX_ONLY - specifies that if the POLYGON_CROP_USE_EACH parameter is specified that each export should just be cropped to the bounding box of each polygon rather than the actual boundary of the polygon. Use POLYGON_CROP_BBOX_ONLY=YES to enable only cropping to the bounding box.
- POLYGON_CROP_NAME_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use for naming, or the special values <Area Display Label> or <Area Source Filename>. If no value is provided, the exported files will be sequentially numbered.
- POLYGON_CROP_FOLDER_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use as a folder name before the actual filename or the special values <Area Display Label>.

DEFINE_PROJ

The DEFINE_PROJ command allows a projection (including datum) to be associated with a name. The projection name can then be used in later IMPORT, IMPORT_ARCHIVE, IMPORT_ASCII, and LOAD_PROJECTION commands to specify a projection as needed.

The DEFINE_PROJ command consists of a single command line followed by a series of lines describing the projection in the format of an ESRI PRJ file. The easiest way to determine the text for a projection is to setup a projection on the Projection tab of the Tools->Configuration and then use the *Save to File* button to create a new .prj file. Then just open the .prj file up in Notepad and copy the contents to the lines following the DEFINE_PROJ command line.

The DEFINE_PROJ command is terminated with a single line containing only the text END_DEFINE_PROJ.

For a sample of the DEFINE_PROJ command in use, load some data and then save a Global Mapper workspace file from the File->Save Workspace menu command. Open the resulting .gmw file in an editor and you can see how the DEFINE_PROJ command is used to define a view projection and the set it.

The following parameters are required by the DEFINE_PROJ command.

- PROJ_NAME - specifies the name to associate with the projection

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DEFINE_SHAPE

The DEFINE_SHAPE command allows a multi-point shape (like a polygon) to be associated with a name. The projection name can then be used in later commands for things like cropping and feathering to polygonal boundaries.

The DEFINE_SHAPE command consists of a single command line followed by a series of lines describing the series of XY coordinate pairs that define the shape. Each line should have a single coordinate value with the X and Y coordinates separated by a comma.

The DEFINE_SHAPE command is terminated with a single line containing only the text END_DEFINE_SHAPE.

The following parameters are required by the DEFINE_SHAPE command.

- SHAPE_NAME - specifies the name to associate with the shape

Here is an example of a DEFINE_SHAPE command used to define a feather polygon with a name of 'FEATHER_POLY'

```
DEFINE_SHAPE SHAPE_NAME="FEATHER_POLY"
        377493.234,4323974.016
        375343.359,4318676.109
        381101.953,4314414.750
        387014.109,4317178.875
        386975.719,4322400.000
        381869.766,4324588.266
        377493.234,4323974.016
END_DEFINE_SHAPE
```

DEFINE_VAR

The DEFINE_VAR command allows you to define a variable and an associated value. You can then use the defined variable name later wrapped in percent signs to have the defined value replaced in the script. This is useful for things like defining a path or something at the top of a script that you can easily change in just one place later.

The following parameters are required by the DEFINE_VAR command.

- NAME - specifies the variable name
- VALUE - specifies the variable value

Here is an example of a DEFINE_VAR command used to define a directory path for later use and then its subsequent use:

```
DEFINE_VAR NAME="DATA_DIR" VALUE="c:\temp\export test"
IMPORT FILENAME="%DATA_DIR%\blue_springs.opt"
```

DIR_LOOP_END

The DIR_LOOP_END command ends a loop of commands over all of the folders within a directory. See the DIR_LOOP_START command for details.

DIR_LOOP_START

The DIR_LOOP_START command begins a loop of commands over all of the folders within a directory (and optionally its subdirectories) that match one or more filename masks. This is a powerful feature allowing you to do things like easily batch convert a collection of files or perform any other supported operation over a collection of files. You end a loop over the files in a folder using the DIR_LOOP_END command. Note that it is also possible to nest loops.

For any commands found within a DIR_LOOP_START...DIR_LOOP end pair defining a loop, the following special character sequences can be used anywhere (examples of what the values will be based on a current filename of 'C:\data\my_file.dem' are listed):

- %DIR% - full path to current file (value is 'C:\data\')
- %FNAME_W_DIR% - full path and filename of current file (value is 'C:\data\my_file.dem')
- %FNAME% - filename of current file (value is 'my_file.dem')
- %FNAME_WO_EXT% - filename of current file without extension (value is 'my_file')
- %PARENT_DIR% - name of parent directory of file (value is 'data')

For a sample of the DIR_LOOP_START command in use, see the example at the bottom of this reference.

The following parameters are used by the DIR_LOOP_START command.

- DIRECTORY - specifies the directory to search for files in. If you leave this blank, the operation will be based in the current folder.
- FILENAME_MASKS - space-separated list of filename masks to import. If no value is provided then all files will be used.

- RECURSE_DIR - specifies whether the loop operation will search subdirectories of the specified directory as well as the current one. Use RECURSE_DIR=YES to enable. The default value is to NOT search subdirectories.

EDIT_VECTOR

The EDIT_VECTOR command allows you to assign feature types (classifications), add/update attributes and display labels, or delete features based on one or more attribute or label values. You can choose to update area, line, and/ or point features with a single operation. You can also supply multiple COMPARE_STR parameters to apply multiple criteria, all of which must be true, in order to edit a feature.

The following parameters are supported by the command:

- FILENAME - filename of the layer to update. If an empty value is passed in, all loaded vector layers will be updated. You can also pass in the value 'USER CREATED FEATURES' when running a script in the context of the main map view or loading a workspace to have the 'User Created Features' layer updated.
- AREA_TYPE - specifies the name of the Global Mapper area type to assign to matching area features.
- LINE_TYPE - specifies the name of the Global Mapper line type to assign to matching line features.
- POINT_TYPE - specifies the name of the Global Mapper point type to assign to matching point features.
- ATTR_VAL - specifies the attribute value to update and what value to assign to it. The format is attr_name=attr_value. For example if you want to set the value of an attribute named CFCC to A34, use ATTR_VAL="CFCC=A34". You can add multiple ATTR_VAL parameters to a single command to provide multiple attribute/value pairs (or labels) to add/update. If you would like to update the feature label rather than an attribute, use <Feature Name> for your attribute name.
- COMPARE_STR - specifies a comparison operation to perform to see if a feature is one that needs to be updated. The format is attr_name=attr_value. For example if you have an attribute named CFCC and you want to match when the value of that attribute starts with an 'A', you can use COMPARE_STR="CFCC=A*" as your parameter. You can add multiple COMPARE_STR parameters to a single command to combine multiple criteria for your search. If you would like to compare against a feature label rather than an attribute, use <Feature Name> for your attribute name. To compare against a feature type name rather than an attribute, use <Feature Type> for your attribute name. To compare against the feature description, use <Feature Desc> for your attribute name.
- ATTR_TO_DELETE - specifies the name of an attribute to delete from matching features. You can include multiple instances of this attribute to delete multiple values. To remove the feature label rather than an attribute, use <Feature Name> for the attribute name.
- ATTR_TO_RENAME - specifies the name of an attribute to rename from matching features and what to rename it to. You can include multiple instances of this attribute to rename multiple attributes. For example, to rename the attribute, CTY to be COUNTY, add the parameter ATTR_TO_RENAME="CTY=COUNTY" to your command.
- ATTR_TO_COPY - specifies the name of an attribute to copy the value of an existing attribute or label to. You can include multiple instances of this parameter to copy multiple attributes. For example, to create a new attribute named DISP_LABEL from the feature label, use ATTR_TO_COPY="DISP_LABEL=<Feature Name>" or to create a new attribute named DEPTH from the value of an attribute named Z, use ATTR_TO_COPY="DEPTH=Z".
- CASE_SENSITIVE - specifies whether or not text comparisons are case sensitive or not. Use CASE_SENSITIVE=YES to enable, by default comparisons are not case sensitive.

- DELETE_FEATURES - specifies whether or not to mark all matching features as deleted. Use DELETE_FEATURES=YES to enable.
- DELETE_DUPLICATES - specifies whether or not to mark matching features that are duplicates (i.e. same coordinates, label, attributes, type, and style) as deleted. Use DELETE_DUPLICATES=YES to enable. Note that this only removes duplicate features that are within the same layer. Duplicates in different layers will not be deleted.
- COORD_OFFSET - specifies the offset to apply to any coordinates for the features that match the specified criteria. The offset should be in the units of the layer the features are being matched from. The offset should be specified as a comma-delimited list of the X and Y offsets, such as COORD_OFFSET="100000.0,200000.0".
- COORD_SCALE - specifies the scale factors to apply to any coordinates for the features that match the specified criteria. Each coordinate will be multiplied by these scale factor. The scale factors should be specified either as a single value (the most common scenario) or as separate scale factors for the X and Y values, like COORD_SCALE=1.00005 for a single value, or COORD_SCALE=1.0045,1.0052 for separate X and Y coordinate scales.
- ROTATE_ANGLE - specifies the angle in degrees by which to rotate matching features by clockwise around some point. The ROTATE_ABOUT parameter specifies what point the feature coordinates are rotated about.
- ROTATE_ABOUT - if a non-zero ROTATE_ANGLE value is specified, specifies the point that the features should be rotated about, with the default being about the center of all matching features. The following values are supported:
    - COMBINED_CENTER - rotates about the combined center of all matching features. This is the default value.
    - INDIVIDUAL_CENTER - rotates each feature about the center of the feature independently.
    - Manually specified location - you can manually specify the X and Y coordinates to rotate about (in the projection of the layer being rotated), like ROTATE_ABOUT="45000.0,1356000.0"
- CONNECT_ISLANDS - specifies that any matching area features with islands should have the islands connected to the outer area boundary to form a single vertex list. This is useful if you need to export the data for use in software that doesn't support area features with holes/islands in them. Use CONNECT_ISLANDS=YES to enable.

For an example of how to use the EDIT_VECTOR command, see the sample at the bottom of this document.

EMBED_SCRIPT

The EMBED_SCRIPT command allows you to call another script from within a script. This can be useful in many situations. For example, if you have a common set of data files that you want to load for each script operation, you could simply create a script that loaded those files, then embed that script within your other scripts.

The following parameters are supported by the command:

- FILENAME - full path to script file to run
- SKIP_UNLOAD_ALL - specifies whether or not the first UNLOAD_ALL command in the script file being run should be skipped. This is useful for embedding workspace files which typically unload everything to start with. Use SKIP_UNLOAD_ALL=YES to skip the first UNLOAD_ALL command.

EXPORT_ELEVATION

The EXPORT_ELEVATION command exports all currently loaded elevation data to a file. The following parameters are supported by the command.

- FILENAME - full path to file to save the data to
- TYPE - type of elevation file we're exporting to
    - ARCASCIIGRID - export an Arc ASCII Grid format file.
    - BIL - export to a BIL format file (simple binary format with header).
    - BT - export to a BT (Binary Terrain) format grid file.
    - DTED - export to DTED format grid files.
    - DXF_3DFACE - export a DXF 3D face format file.
    - DXF_MESH - export a 3D DXF mesh format file.
    - DXF_POINT - export a 3D DXF point format file.
    - ERDAS - export to an Erdas Imagine IMG format file.
    - FBX - export to Open Flight FBX format file.
    - FLOATGRID - export a Float/Grid format file.
    - GEOSOFT_GRID - export to a Geosoft grid format file.
    - GEOTIFF - export to a GeoTIFF format file.
    - GLOBAL_MAPPER_GRID - export to a Global Mapper Grid format file.
    - GRAVSOFT_GRID - export to a Gravsoft Grid format file.
    - HF2 - export to a HF2/HFZ format file.
    - IDRISI_RASTER - export to an Idrisi elevation format file.
    - LEVELLER_HF - export to a Leveller heightfield file.
    - LIDAR_LAS - export to a Lidar LAS file.
    - MAPMAKERTERRAIN - export to a MapMaker Terrain format file.
    - ROCKWORKS_GRID - export to a RockWorks Grid format file.
    - STL - export to a STL format file
    - SURFERGRID - export to a Surfer Grid format file. The FORMAT parameter specifies whether it is an ASCII or binary format Surfer Grid file.
    - TERRAGEN - export to a Terragen terrain file.
    - USGS_DEM - export to a native format USGS DEM file.
    - VRML - export to a VRML file.
    - VULCAN_3D - export to a Vulcan3D triangulation file.
    - XYZ_GRID - export to a XYZ Grid file.
- ELEV_UNITS - specify elevation units to use in export
    - FEET - export in US feet
    - DECIFEET - export in 10ths of US feet
    - METERS - export in meters
    - DECIMETERS - export in 10ths of meters
    - CENTIMETERS - export in centimeters
- SPATIAL_RES - specifies spatial resolution. Defaults to the minimum spatial resolution of all loaded data if not specified. Should be formatted as x_resolution,y_resolution. The units are the units of the current global projection. For example, if UTM was the current global projection and you wanted to export at 30 meter spacing, the parameter/value pair would look like SPATIAL_RES=30.0,30.0.
- SPATIAL_RES_METERS - specifies spatial resolution to use in meters. The value in meters will automatically be converted to the curent view/export projection units. For example, to do an export at 2.0 meter spacing (or as close as you can get to that in the current units), use SPATIAL_RES_METERS=2.0, or to do an export at 1.0 meters in X by 1.5 meters in Y, use SPATIAL_RES_METERS="1.0,1.5".

- FORCE_SQUARE_PIXELS - if this value is set to YES, the spatial resolution of the resultant elevation file will be set so that the x and y pixel size are the same, with the minimum default size being used for both.
- GLOBAL_BOUNDS - specifies the export bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, maximum x, maximum y.
- GLOBAL_BOUNDS_SIZE - specifies the export bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, width in x, width in y.
- LAT_LON_BOUNDS - specifies the export bounds in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.
- LAYER_BOUNDS - specifies that the export should use the bounds of the loaded layer(s) with the given filename. For example, to export to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.
- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.
- FORMAT (*SURFERGRID* only) - determines if Surfer Grid export format is ASCII, BINARY_V6, or BINARY_V7. The default is ASCII if no format is specified.
- GEN_WORLD_FILE (*GEOTIFF* only) - specifies that a TIFF world file (TFW) should be generated in addition to the TIFF file. Use GEN_WORLD_FILE=YES to turn on.
- GEN_TAB_FILE (*GEOTIFF* only) - specifies that a MapInfo TAB file should be generated in addition to the GeoTIFF file. Use GEN_TAB_FILE=YES to turn on.
- GRID_TYPE_CELL_SIZE - specifies that the export should be gridded into multiple tiles with each tile having the given size in the export projection. The value should be specified as *cell width*,*cell height*. For example, if you are exporting in a metric projection and want to tile the export into cells that are 10,000 meters wide by 5,000 meters tall, you would use GRID_TYPE_CELL_SIZE="10000.0,5000.0".
- GRID_TYPE_PIXEL_SIZE - specifies that the export should be gridded into multiple tiles with each tile having the given size in pixels/samples. The value should be specified as *cell pixel width*,*cell pixel height*. For example, if you want to tile the export into cells that are 800 pixels wide by 600 meters tall, you would use GRID_TYPE_PIXEL_SIZE="800,600".
- GRID_TYPE_ROWS_COLS - specifies that the export should be gridded into multiple tiles with a given number of rows and columns of tiles. The value should be specified as *number of rows*,*number of columns*. For example, if you want to tile the export into a grid of 8 rows each 4 tiles across, you would use GRID_TYPE_ROWS_COLS="8,4".
- GRID_OVERLAP - specifies how much to overlap tiles when gridding an export into multiple tiles. This is a percentage value from 0 to 100 and only applies when on of the GRID_TYPE_* parameters is used. For example, to make your grid tiles overlap by 5% of the grid tile size, use GRID_OVERLAP="5.0". The default value is 0.0, meaning that the tiles do not overlap.
- GRID_KEEP_CELL_SIZE - specifies that the size of the grid cells should be maintained over sample spacing. This means that if you specify a grid of 4 rows and 5 columns, each grid cell will be exactly 25% of the total export height and 20% of the total export width. The sample spacing may be slightly smaller than what is specified in order to achieve this. By default, the sample spacing is exactly maintained and each grid cell may be slightly larger than specified to maintain an integer number of exported cells. Use GRID_KEEP_CELL_SIZE=YES to enable.

- GRID_NAMING - specifies how to name tiles when gridding an export into multiple tiles. The value should be SEQUENTIAL for sequential numeric naming starting at 1, SEPARATE for separate prefix appending by row and column, or SEPARATE_COLS_FIRST for separate prefix appending by columns and rows. For the SEPARATE options, use the GRID_NAMING_COLS and GRID_NAMING_ROWS parameters to specify the details of how to name the rows and columns. If no GRID_NAMING parameter is supplied, the last selected grid naming options selected in the user interface will be used.
- GRID_NAMING_COLS - specifies how to name the column portion of grid cell names when using the GRID_NAMING=SEPARATE or GRID_NAMING=SEPARATE_COLS_FIRST parameter. The value of this field is a comma-delimited list with the following field values:
    - *Naming type*. Can have the following values:
        - NUM - name using numbers in ascending order
        - NUM_REVERSE - name using numbers in descending order
        - ALPHA - name using letters in ascending order
        - ALPHA_REVERSE - name using letters in descending order
    - *Starting value* for numbering or lettering (i.e. '1', or 'A').
    - *Prefix string* to use before the numeric or alphabetic value.
    - *Step value* for numeric naming (default is '1')

  You can leave values blank if they don't apply or you want to use the default. As an example, to do numeric naming starting at the number 100, increasing by 10 each time with a prefix of DEM, you would use GRID_NAMING_COLS="NUM,100,DEM,10".
- GRID_NAMING_ROWS - specifies how to name the row portion of grid cell names when using the GRID_NAMING=SEPARATE parameter. See the documentation for the GRID_NAMING_COLS parameter above for details on the format.
- GRID_NAMING_PREPEND_ZEROES - specifies whether or not to prepend zeroes to the start of grid column/row names. Use GRID_NAMING_PREPEND_ZEROES=NO to disable the prepending of zeroes.
- GRID_NAMING_SEPARATOR - specifies the separator string to use between pieces of a grid name. The default is an underscore.
- GRID_CREATE_FOLDERS - specifies that a separate folder should be generated for each row (or column if GRID_NAMING=SEPARATE_COLS_FIRST is specified) of the export rather than placing every output file in the same folder.
- QUAD_NAME (*USGS_DEM* only) - specifies the quad name to place in the header of the USGS DEM file.
- FILL_GAPS - specifies that small gaps in between and within the data sets being exported will be filled in by interpolating the surrounding data to come up with an elevation for the point in question. This option is on by default, specify FILL_GAPS=NO to turn off.
- VERT_EXAG (*VRML* only) - specifies the vertical exaggeration to use when creating the VRML file. Larger values result in a rougher terrain being generated while smaller values result in a smoother terrain. A value of 1.0 results in no vertical exaggeration at all (i.e. a nearly true to life representation). If you don't specify a value the currently selected vertical exaggeration value on the Vertical Options tab of the Configuation dialog will be used.
- COORD_DELIM (*XYZ_GRID* only) - specifies the delimeter between coordinates
    - COMMA - coordinates are separated by commas
    - FIXED_WIDTH - coordinates are stored in fixed width columns
    - SEMICOLON - coordinates are separated by semicolons
    - SPACE - coordinates are separated by space characters
    - TAB - coordinates are separated by tab characters
- BYTES_PER_SAMPLE (*BIL*, *ERDAS*, and *GEOTIFF* only) - specifies how many bytes to use per elevation sample in the BIL, IMG, or vertical GeoTIFF file. Valid values are 2 bytes (16-bits) and 4 bytes (32-bits). If this value isn't specified, 2 bytes are used.

- USE_BIG_ENDIAN (*BIL* only) - specifies that elevation values written to BIL files should use big endian (Motorola byte order) rather than the default little endian (Intel byte order).
- USE_ESRI_HDR (*BIL* only) - specifies that the ESRI .hdr format should be used for the export. Use USE_ESRI_HDR=YES to enable.
- POLYGON_CROP_FILE - specifies the full path and filename of a vector file containing a polygon feature to which the export should be cropped. If multiple polygons are found in the specified file the polygon which has the largest intersection with the data to be exported will be used as the crop polygon (see POLYGON_CROP_USE_ALL for exception).
- POLYGON_CROP_NAME - specifies the name of a polygon shape previously defined using the DEFINE_SHAPE command to which the export should be cropped. The coordinates in the shape need to have been provided in whatever projection the export is being done in.
- POLYGON_CROP_USE_ALL - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the export will be cropped to all polygons in that file rather than just the best-fit polygon.
- POLYGON_CROP_USE_EACH - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the operation will generate a separate export for each polygons in that file rather than just the best-fit polygon. See the POLYGON_CROP_BBOX_ONLY and POLYGON_CROP_NAME_ATTR options for naming and other options when using this parameter. Use POLYGON_CROP_USE_EACH=YES to enable.
- POLYGON_CROP_BBOX_ONLY - specifies that if the POLYGON_CROP_USE_EACH parameter is specified that each export should just be cropped to the bounding box of each polygon rather than the actual boundary of the polygon. Use POLYGON_CROP_BBOX_ONLY=YES to enable only cropping to the bounding box.
- POLYGON_CROP_NAME_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use for naming, or the special values <Area Display Label> or <Area Source Filename>. If no value is provided, the exported files will be sequentially numbered.
- POLYGON_CROP_FOLDER_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use as a folder name before the actual filename or the special values <Area Display Label>.
- ALLOW_LOSSY (*GLOBAL_MAPPER_GRID* only) - specifies whether or not a slight loss in precision is allowable in order to achieve better compression ratios. The default is YES, so turn only use lossless compression you need to specify a value of ALLOW_LOSSY=NO.
- EXPORT_COLORS (*XYZ_GRID* only) - specifies that RGB color values should be exported for each coordinate that is saved.
- OVERWRITE_EXISTING - specifies that existing files should be overwritten. The default is OVERWRITE_EXISTING=YES, so use OVERWRITE_EXISTING=NO to skip exporting files that already exist.
- ADD_OVERVIEW_LAYERS (*ERDAS* only) - specifies that overview (pyramid) layers should be generated for the export. Use ADD_OVERVIEW_LAYERS=YES to enable.
- BLOCK_SIZE (*ERDAS* only) - specifies the block size to use for the export. The default is BLOCK_SIZE=64.
- COMPRESS_OUTPUT (*ERDAS* only) - specifies whether or not the exported file should be compress. The default is COMPRESS_OUTPUT=YES.
- TILE_SIZE (*GEOTIFF* only) - specifies that the GeoTIFF file should be exported with a tiled organization and use the specified tile size. This tile size should be between 8 and 2048. Typical values are 64, 128, and 256.
- DISABLE_BIGTIFF (*GEOTIFF* only) - use to disable the automatic creation of BigTIFF-format files for very large exports. Use DISABLE_BIGTIFF=YES to disable the automatic BigTIFF support.

- EXPORT_SLOPE (*FLOAT_GRID* only) - use to specify that slope values should be exported rather than elevation values. Use EXPORT_SLOPE=YES to enable.
- EXPORT_SLOPE_DIR (*FLOAT_GRID* only) - use to specify that slope direction values should be exported rather than elevation values. Use EXPORT_SLOPE_DIR=YES to enable.
- EXPORT_SLOPE_PERCENT (*FLOAT_GRID* only) - use to specify that slope values should be exported as percent slope rather than degrees. Use EXPORT_SLOPE_PERCENT=YES to enable and also make sure to add EXPORT_SLOPE=YES to the command line.
- DTED_LEVEL (*DTED* only) - specifies which DTED level to export to. The values must be between 0 and 5 (with 0, 1, and 2) being the only levels supported by most applications.

EXPORT_METADATA

The EXPORT_METADATA command exports the metadata for a specified load layer. The following parameters are supported by the command.

- FILENAME - full path of file (must already be loaded) that you want to save the metadata for.
- METADATA_FILENAME - full path of new text file to create on disk containing the metadata for the specified layer.

EXPORT_PACKAGE

The EXPORT_PACKAGE command exports all currently loaded raster, vector, and elevation data to a Global Mapper Package (GMP) file. The following parameters are supported by the command.

- FILENAME - full path to file to save the data to
- SIMPLIFICATION - specifies the simplification threshold to use when exporting the vector features. This specifies how far off a straight line (in the units of the current projection) that a point has to be before it is kept. Generally you should not specify a simplification value as the default just exports all vertices as they are. This is an option for advanced users only.
- SINGLE_PRECISION - specifies that vector coordinates should be written out as 4-byte single precision floating point numbers rather than the default 8-byte double precision floating point numbers. Use SINGLE_PRECISION=YES to enable single precision export, which will result in smaller files.
- DISCARD_ATTRIBUTES - specifies that the list of attribute-value pairs for each vector feature should not be written out. Use DISCARD_ATTRIBUTES=YES to enable this behavior.
- VECTOR_ONLY - specifies that only vector layers should be exported to the package file. Use VECTOR_ONLY=YES to enable.
- KEEP_ALL_STYLES - specifies that the full style of each feature should be written to the package file, even if it uses the current default for the type. Use KEEP_ALL_STYLES=YES to enable this. This is useful if you want features to look exactly the same on all systems and not be affected by changes to the default styling for types.
- KEEP_NATIVE_PROJECTION - specifies that each layer should be exported in the native projection of the layer rather than reprojected to the current projection. Use KEEP_NATIVE_PROJECTION=YES to enable this behavior.
- COMBINE_VECTOR_LAYERS - specifies that all vector data should be combined into a single layer within the package file. Use COMBINE_VECTOR_LAYERS=YES to enable this behavior.
- GLOBAL_BOUNDS - specifies the export bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in

order of minimum x, minimum y, maximum x, maximum y.

- GLOBAL_BOUNDS_SIZE - specifies the export bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, width in x, width in y.
- LAT_LON_BOUNDS - specifies the export bounds in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.
- LAYER_BOUNDS - specifies that the export should use the bounds of the loaded layer(s) with the given filename. For example, to export to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.
- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.
- GRID_TYPE_CELL_SIZE - specifies that the export should be gridded into multiple tiles with each tile having the given size in the export projection. The value should be specified as *cell width*,*cell height*. For example, if you are exporting in a metric projection and want to tile the export into cells that are 10,000 meters wide by 5,000 meters tall, you would use GRID_TYPE_CELL_SIZE="10000.0,5000.0".
- GRID_TYPE_ROWS_COLS - specifies that the export should be gridded into multiple tiles with a given number of rows and columns of tiles. The value should be specified as *number of rows*,*number of columns*. For example, if you want to tile the export into a grid of 8 rows each 4 tiles across, you would use GRID_TYPE_ROWS_COLS="8,4".
- GRID_OVERLAP - specifies how much to overlap tiles when gridding an export into multiple tiles. This is a percentage value from 0 to 100 and only applies when on of the GRID_TYPE_* parameters is used. For example, to make your grid tiles overlap by 5% of the grid tile size, use GRID_OVERLAP="5.0". The default value is 0.0, meaning that the tiles do not overlap.
- GRID_KEEP_CELL_SIZE - specifies that the size of the grid cells should be maintained over sample spacing. This means that if you specify a grid of 4 rows and 5 columns, each grid cell will be exactly 25% of the total export height and 20% of the total export width. The sample spacing may be slightly smaller than what is specified in order to achieve this. By default, the sample spacing is exactly maintained and each grid cell may be slightly larger than specified to maintain an integer number of exported cells. Use GRID_KEEP_CELL_SIZE=YES to enable.
- GRID_NAMING - specifies how to name tiles when gridding an export into multiple tiles. The value should be SEQUENTIAL for sequential numeric naming starting at 1, SEPARATE for separate prefix appending by row and column, or SEPARATE_COLS_FIRST for separate prefix appending by columns and rows. For the SEPARATE options, use the GRID_NAMING_COLS and GRID_NAMING_ROWS parameters to specify the details of how to name the rows and columns. If no GRID_NAMING parameter is supplied, the last selected grid naming options selected in the user interface will be used.
- GRID_NAMING_COLS - specifies how to name the column portion of grid cell names when using the GRID_NAMING=SEPARATE or GRID_NAMING=SEPARATE_COLS_FIRST parameter. The value of this field is a comma-delimited list with the following field values:
    - *Naming type*. Can have the following values:
        - NUM - name using numbers in ascending order
        - NUM_REVERSE - name using numbers in descending order
        - ALPHA - name using letters in ascending order
        - ALPHA_REVERSE - name using letters in descending order

- *Starting value* for numbering or lettering (i.e. '1', or 'A').
- *Prefix string* to use before the numeric or alphabetic value.
- *Step value* for numeric naming (default is '1')

You can leave values blank if they don't apply or you want to use the default. As an example, to do numeric naming starting at the number 100, increasing by 10 each time with a prefix of DEM, you would use GRID_NAMING_COLS="NUM,100,DEM,10".

- GRID_NAMING_ROWS - specifies how to name the row portion of grid cell names when using the GRID_NAMING=SEPARATE parameter. See the documentation for the GRID_NAMING_COLS parameter above for details on the format.
- GRID_NAMING_PREPEND_ZEROES - specifies whether or not to prepend zeroes to the start of grid column/row names. Use GRID_NAMING_PREPEND_ZEROES=NO to disable the prepending of zeroes.
- GRID_NAMING_SEPARATOR - specifies the separator string to use between pieces of a grid name. The default is an underscore.
- GRID_CREATE_FOLDERS - specifies that a separate folder should be generated for each row (or column if GRID_NAMING=SEPARATE_COLS_FIRST is specified) of the export rather than placing every output file in the same folder.
- POLYGON_CROP_FILE - specifies the full path and filename of a vector file containing a polygon feature to which the export should be cropped. If multiple polygons are found in the specified file the polygon which has the largest intersection with the data to be exported will be used as the crop polygon (see POLYGON_CROP_USE_ALL or POLYGON_CROP_USE_EACH for exceptions).
- POLYGON_CROP_NAME - specifies the name of a polygon shape previously defined using the DEFINE_SHAPE command to which the export should be cropped. The coordinates in the shape need to have been provided in whatever projection the export is being done in.
- POLYGON_CROP_USE_ALL - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the export will be cropped to all polygons in that file rather than just the best-fit polygon.
- POLYGON_CROP_USE_EACH - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the operation will generate a separate export for each polygons in that file rather than just the best-fit polygon. See the POLYGON_CROP_BBOX_ONLY and POLYGON_CROP_NAME_ATTR options for naming and other options when using this parameter. Use POLYGON_CROP_USE_EACH=YES to enable.
- POLYGON_CROP_BBOX_ONLY - specifies that if the POLYGON_CROP_USE_EACH parameter is specified that each export should just be cropped to the bounding box of each polygon rather than the actual boundary of the polygon. Use POLYGON_CROP_BBOX_ONLY=YES to enable only cropping to the bounding box.
- POLYGON_CROP_NAME_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use for naming, or the special values <Area Display Label> or <Area Source Filename>. If no value is provided, the exported files will be sequentially numbered.
- POLYGON_CROP_FOLDER_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use as a folder name before the actual filename or the special values <Area Display Label>.
- OVERWRITE_EXISTING - specifies that existing files should be overwritten. The default is OVERWRITE_EXISTING=YES, so use OVERWRITE_EXISTING=NO to skip exporting files that already exist.

EXPORT_PDF

The EXPORT_PDF command exports all currently loaded data to a PDF file. The following parameters are supported by the command.

- FILENAME - full path to file to save the data to
- DPI - specifies the DPI that the file is generated at.
- PDF_PAGE_SIZE - specifies the name of the paper size to use. This should match one of the entries on the PDF export dialog, like landscape, portrait, A0, etc.
- PDF_PAGE_ORIENTATION - specifies the page orientation to use for the generated PDF file. The following values are supported:
    - AUTO - Automatically determine whether to use portrait or landscape mode based on export bounds aspect ratio.
    - PORTRAIT
    - LANDSCAPE
- PDF_MARGINS - specifies the margins to use in inches. The value should be a comma-delimited list of numbers for the left, top, right, and bottom margins. For example, PDF_MARGINS="0.5,1.0,0.5,1.25" would result in a 0.5 inch margin for the left and right, 1.0 inch for the top, and 1.25 inches for the bottom.
- PDF_HEADER - specifies the header to use
- PDF_FOOTER - specifies the footer to use
- PDF_COMBINE_RASTERS - specifies whether multiple raster layers should be combined into a single layer or kept separate. Use PDF_COMBINE_RASTERS=YES to combine them or PDF_COMBINE_RASTER_LAYERS=NO to keep separate.
- PDF_FILL_PAGE - specifies whether the PDF export should fill the page or be cropped to the exact bounds specified. Use PDF_FILL_PAGE=YES to enable or PDF_FILL_PAGE=NO to disable.
- PDF_FONT_SCALE - specifies the scale factor to apply to text. For example use PDF_FONT_SCALE=2.0 to double the size of text.
- PDF_SYMBOL_SCALE - specifies the scale factor to apply to point symbols and icons. For example use PDF_SYMBOL_SCALE=2.0 to double the size of symbols.
- VECTOR_ONLY - specifies that only vector layers should be exported to the PDF file. Use VECTOR_ONLY=YES to enable.
- GLOBAL_BOUNDS - specifies the export bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, maximum x, maximum y.
- GLOBAL_BOUNDS_SIZE - specifies the export bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, width in x, width in y.
- LAT_LON_BOUNDS - specifies the export bounds in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.
- LAYER_BOUNDS - specifies that the export should use the bounds of the loaded layer(s) with the given filename. For example, to export to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.
- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.

- GRID_TYPE_CELL_SIZE - specifies that the export should be gridded into multiple tiles with each tile having the given size in the export projection. The value should be specified as *cell width*,*cell height*. For example, if you are exporting in a metric projection and want to tile the export into cells that are 10,000 meters wide by 5,000 meters tall, you would use GRID_TYPE_CELL_SIZE="10000.0,5000.0".
- GRID_TYPE_ROWS_COLS - specifies that the export should be gridded into multiple tiles with a given number of rows and columns of tiles. The value should be specified as *number of rows*,*number of columns*. For example, if you want to tile the export into a grid of 8 rows each 4 tiles across, you would use GRID_TYPE_ROWS_COLS="8,4".
- GRID_OVERLAP - specifies how much to overlap tiles when gridding an export into multiple tiles. This is a percentage value from 0 to 100 and only applies when on of the GRID_TYPE_* parameters is used. For example, to make your grid tiles overlap by 5% of the grid tile size, use GRID_OVERLAP="5.0". The default value is 0.0, meaning that the tiles do not overlap.
- GRID_KEEP_CELL_SIZE - specifies that the size of the grid cells should be maintained over sample spacing. This means that if you specify a grid of 4 rows and 5 columns, each grid cell will be exactly 25% of the total export height and 20% of the total export width. The sample spacing may be slightly smaller than what is specified in order to achieve this. By default, the sample spacing is exactly maintained and each grid cell may be slightly larger than specified to maintain an integer number of exported cells. Use GRID_KEEP_CELL_SIZE=YES to enable.
- GRID_NAMING - specifies how to name tiles when gridding an export into multiple tiles. The value should be SEQUENTIAL for sequential numeric naming starting at 1, SEPARATE for separate prefix appending by row and column, or SEPARATE_COLS_FIRST for separate prefix appending by columns and rows. For the SEPARATE options, use the GRID_NAMING_COLS and GRID_NAMING_ROWS parameters to specify the details of how to name the rows and columns. If no GRID_NAMING parameter is supplied, the last selected grid naming options selected in the user interface will be used.
- GRID_NAMING_COLS - specifies how to name the column portion of grid cell names when using the GRID_NAMING=SEPARATE or GRID_NAMING=SEPARATE_COLS_FIRST parameter. The value of this field is a comma-delimited list with the following field values:
    - *Naming type*. Can have the following values:
        - NUM - name using numbers in ascending order
        - NUM_REVERSE - name using numbers in descending order
        - ALPHA - name using letters in ascending order
        - ALPHA_REVERSE - name using letters in descending order
    - *Starting value* for numbering or lettering (i.e. '1', or 'A').
    - *Prefix string* to use before the numeric or alphabetic value.
    - *Step value* for numeric naming (default is '1')

  You can leave values blank if they don't apply or you want to use the default. As an example, to do numeric naming starting at the number 100, increasing by 10 each time with a prefix of DEM, you would use GRID_NAMING_COLS="NUM,100,DEM,10".
- GRID_NAMING_ROWS - specifies how to name the row portion of grid cell names when using the GRID_NAMING=SEPARATE parameter. See the documentation for the GRID_NAMING_COLS parameter above for details on the format.
- GRID_NAMING_PREPEND_ZEROES - specifies whether or not to prepend zeroes to the start of grid column/row names. Use GRID_NAMING_PREPEND_ZEROES=NO to disable the prepending of zeroes.
- GRID_NAMING_SEPARATOR - specifies the separator string to use between pieces of a grid name. The default is an underscore.
- GRID_CREATE_FOLDERS - specifies that a separate folder should be generated for each row (or column if GRID_NAMING=SEPARATE_COLS_FIRST is specified) of the export rather than placing every output file in the same folder.

- POLYGON_CROP_FILE - specifies the full path and filename of a vector file containing a polygon feature to which the export should be cropped. If multiple polygons are found in the specified file the polygon which has the largest intersection with the data to be exported will be used as the crop polygon (see POLYGON_CROP_USE_ALL or POLYGON_CROP_USE_EACH for exceptions).
- POLYGON_CROP_NAME - specifies the name of a polygon shape previously defined using the DEFINE_SHAPE command to which the export should be cropped. The coordinates in the shape need to have been provided in whatever projection the export is being done in.
- POLYGON_CROP_USE_ALL - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the export will be cropped to all polygons in that file rather than just the best-fit polygon.
- POLYGON_CROP_USE_EACH - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the operation will generate a separate export for each polygons in that file rather than just the best-fit polygon. See the POLYGON_CROP_BBOX_ONLY and POLYGON_CROP_NAME_ATTR options for naming and other options when using this parameter. Use POLYGON_CROP_USE_EACH=YES to enable.
- POLYGON_CROP_BBOX_ONLY - specifies that if the POLYGON_CROP_USE_EACH parameter is specified that each export should just be cropped to the bounding box of each polygon rather than the actual boundary of the polygon. Use POLYGON_CROP_BBOX_ONLY=YES to enable only cropping to the bounding box.
- POLYGON_CROP_NAME_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use for naming, or the special values <Area Display Label> or <Area Source Filename>. If no value is provided, the exported files will be sequentially numbered.
- POLYGON_CROP_FOLDER_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use as a folder name before the actual filename or the special values <Area Display Label>.
- OVERWRITE_EXISTING - specifies that existing files should be overwritten. The default is OVERWRITE_EXISTING=YES, so use OVERWRITE_EXISTING=NO to skip exporting files that already exist.

EXPORT_RASTER

The EXPORT_RASTER command exports all currently loaded raster, vector, and elevation data to a file. The following parameters are supported by the command.

- FILENAME - full path to file to save the data to
- TYPE - type of raster file we're exporting to
    - BIL - export to a band interleave (BIL) format file.
    - BIP - export to a band interleaved pixel (BIP) format file.
    - BMP - export to a Windows bitmap (BMP) format file.
    - BSQ - export to a band sequential (BSQ) format file.
    - ECW - export to an ECW format file.
    - ERDAS - export to an Erdas Imagine IMG format file.
    - GEOTIFF - export to a GeoTIFF format file.
    - IDRISI_RASTER - export to an Idrisi raster format file.
    - JPEG - export to a JPG format file.
    - JPEG2000 - export to a JPEG2000 format file.

    - KML - export to a raster KML/KMZ format file for display in Google Earth.
    - PNG - export to a PNG format file.
- SPATIAL_RES - specifies spatial resolution. Defaults to the minimum spatial resolution of all loaded data if not specified. Should be formatted as x_resolution,y_resolution. The units are the units of the current global projection. For example, if UTM was the current global projection and you wanted to export at 30 meter spacing, the parameter/value pair would look like SPATIAL_RES=30.0,30.0.
- SPATIAL_RES_METERS - specifies spatial resolution to use in meters. The value in meters will automatically be converted to the curent view/export projection units. For example, to do an export at 2.0 meter spacing (or as close as you can get to that in the current units), use SPATIAL_RES_METERS=2.0, or to do an export at 1.0 meters in X by 1.5 meters in Y, use SPATIAL_RES_METERS="1.0,1.5".
- PIXEL_SIZE - specifies the desired size in pixels of your export. Use this instead of SPATIAL_RES if you know exactly how many pixels in size your export should be. The format is PIXEL_SIZE="*width*x*height*". For example, to make your export have dimensions of 1024 pixels wide by 768 pixels tall, use PIXEL_SIZE="1024x768".
- FORCE_SQUARE_PIXELS - if this value is set to YES, the spatial resolution of the resultant raster file will be set so that the x and y pixel size are the same, with the minimum default size being used for both.
- GLOBAL_BOUNDS - specifies the export bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, maximum x, maximum y.
- GLOBAL_BOUNDS_SIZE - specifies the export bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, width in x, width in y.
- LAT_LON_BOUNDS - specifies the export bounds in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.
- LAYER_BOUNDS - specifies that the export should use the bounds of the loaded layer(s) with the given filename. For example, to export to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.
- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.
- GEN_WORLD_FILE - specifies that a world file should be generated in addition to the image file. Use GEN_WORLD_FILE=YES to turn on.
- GEN_TAB_FILE (*GEOTIFF* and *PNG*only) - specifies that a MapInfo TAB file should be generated in addition to the image file. Use GEN_TAB_FILE=YES to turn on.
- GEN_PRJ_FILE - specifies that a projection (PRJ) file should be generated in addition to the data file. Use GEN_PRJ_FILE=YES to turn on.
- PALETTE - specifies the palette/image type to use. If not specified, a 24-bit RGB image will be generated.
    - KEEP_SOURCE

      - The exported file will use the some color configuration (if possible) as the file being exported. Note that this option is only available if you have only a single layer loaded for export.

- OPTIMIZED (*BMP*, *ERDAS*, *GEOTIFF*, and *PNG* only) - The palette generated will be an optimal mix of up to 256 colors that will closely represent the full blend of colors in the source images. This option will generate the best results, but can more than double the export time required if any high color images are present in the export set.
- HALFTONE (*BMP*, *ERDAS*, *GEOTIFF*, and *PNG* only) - use a 256-color halftone palette spread over the color spectrum
- DOQ_DRG (*BMP*, *ERDAS*, *GEOTIFF*, and *PNG* only) - use a 256-color palette optimized for combined grayscale DOQs and USGS DRGs
- DRG (*BMP*, *ERDAS*, *GEOTIFF*, and *PNG* only) - use a 256-color palette optimized for the colors found in USGS DRGs
- GRAYSCALE - use a 256-color grayscale palette
- BW (*BMP*, *GEOTIFF* only) - creates a black and white, 1-bit per pixel image
- BLACKISMIN (*GEOTIFF* only) - creates an 8-bit per pixel grayscale image with no color map stored in the image. Black will be stored as zero with varying shades of gray up to white with a value of 255.
- WHITEISMIN (*GEOTIFF* only) - creates an 8-bit per pixel grayscale image with no color map stored in the image. White will be stored as zero with varying shades of gray up to black with a value of 255.
- JPG (*GEOTIFF* only) - creates a 24-bit RGB JPG-in-TIFF image. Note that while this creates a highly compressed GeoTIFF file, many software packages do not recognize JPG-in-TIFF format files.
- MULTIBAND (*BIL*, *BIP*. *BSQ*, *GEOTIFF*, and *JPEG2000* only) - creates a multi-band image file with any number of bands of data. This is useful for multi-spectral imagery. Either 8- or 16-bits per band will be used depending on what is available in the input data. Use the NUM_BANDS parameter to specify how many bands to use. You can override the default band setting using the BAND_EXPORT_SETUP parameter (described below).
- Custom palette filename - you can also pass in the full path to a .pal file containing a custom palette to use for the export.

- NUM_BANDS - specifies how many bands of data to export for a PALETTE=MULTIBAND export. If you don't specify a value for this the band count will be the maximum available for any of the loaded layers.
- BAND_BIT_DEPTH - specifies how many bits to use for each band of data for a PALETTE=MULTIBAND export. If you don't specify a value for this the highest bit depth of any of the input data layers will be used. The valid values are BAND_BIT_DEPTH=8, BAND_BIT_DEPTH=16, or BAND_BIT_DEPTH=32.
- BAND_EXPORT_SETUP - allows you to override the default band assignment for a MULTIBAND export. Use the following format to specify what band from what layer to use for a given export band: <output_band>?<input_band>?<layer_filename> . So for example to assign the 4th (infrared) band in an export from the 1st (red) band in a previously loaded file name C:\data\input_file.tif, use the following parameter: BAND_EXPORT_SETUP="4?1?c:\data\input_file.tif". Note that you would include a separate BAND_EXPORT_SETUP parameter for each output band that you want to setup. If you leave off the filename then you all loaded data will be considered as input, with just the input-to-output band assignment being updated.
- GRID_TYPE_CELL_SIZE - specifies that the export should be gridded into multiple tiles with each tile having the given size in the export projection. The value should be specified as *cell width*,*cell height*. For example, if you are exporting in a metric projection and want to tile the export into cells that are 10,000 meters wide by 5,000 meters tall, you would use GRID_TYPE_CELL_SIZE="10000.0,5000.0".
- GRID_TYPE_PIXEL_SIZE - specifies that the export should be gridded into multiple tiles with each tile having the given size in pixels/samples. The value should be specified as *cell pixel width*,*cell pixel height*. For example, if you want to tile the export into cells that are 800 pixels wide by 600 meters

tall, you would use GRID_TYPE_PIXEL_SIZE="800,600".

- GRID_TYPE_ROWS_COLS - specifies that the export should be gridded into multiple tiles with a given number of rows and columns of tiles. The value should be specified as *number of rows*,*number of columns*. For example, if you want to tile the export into a grid of 8 rows each 4 tiles across, you would use GRID_TYPE_ROWS_COLS="8,4".
- GRID_OVERLAP - specifies how much to overlap tiles when gridding an export into multiple tiles. This is a percentage value from 0 to 100 and only applies when on of the GRID_TYPE_* parameters is used. For example, to make your grid tiles overlap by 5% of the grid tile size, use GRID_OVERLAP="5.0". The default value is 0.0, meaning that the tiles do not overlap.
- GRID_KEEP_CELL_SIZE - specifies that the size of the grid cells should be maintained over sample spacing. This means that if you specify a grid of 4 rows and 5 columns, each grid cell will be exactly 25% of the total export height and 20% of the total export width. The sample spacing may be slightly smaller than what is specified in order to achieve this. By default, the sample spacing is exactly maintained and each grid cell may be slightly larger than specified to maintain an integer number of exported cells. Use GRID_KEEP_CELL_SIZE=YES to enable.
- GRID_NAMING - specifies how to name tiles when gridding an export into multiple tiles. The value should be SEQUENTIAL for sequential numeric naming starting at 1, SEPARATE for separate prefix appending by row and column, or SEPARATE_COLS_FIRST for separate prefix appending by columns and rows. For the SEPARATE options, use the GRID_NAMING_COLS and GRID_NAMING_ROWS parameters to specify the details of how to name the rows and columns. If no GRID_NAMING parameter is supplied, the last selected grid naming options selected in the user interface will be used.
- GRID_NAMING_COLS - specifies how to name the column portion of grid cell names when using the GRID_NAMING=SEPARATE or GRID_NAMING=SEPARATE_COLS_FIRST parameter. The value of this field is a comma-delimited list with the following field values:
    - *Naming type*. Can have the following values:
        - NUM - name using numbers in ascending order
        - NUM_REVERSE - name using numbers in descending order
        - ALPHA - name using letters in ascending order
        - ALPHA_REVERSE - name using letters in descending order
    - *Starting value* for numbering or lettering (i.e. '1', or 'A').
    - *Prefix string* to use before the numeric or alphabetic value.
    - *Step value* for numeric naming (default is '1')

  You can leave values blank if they don't apply or you want to use the default. As an example, to do numeric naming starting at the number 100, increasing by 10 each time with a prefix of DEM, you would use GRID_NAMING_COLS="NUM,100,DEM,10".
- GRID_NAMING_ROWS - specifies how to name the row portion of grid cell names when using the GRID_NAMING=SEPARATE parameter. See the documentation for the GRID_NAMING_COLS parameter above for details on the format.
- GRID_NAMING_PREPEND_ZEROES - specifies whether or not to prepend zeroes to the start of grid column/row names. Use GRID_NAMING_PREPEND_ZEROES=NO to disable the prepending of zeroes.
- GRID_NAMING_SEPARATOR - specifies the separator string to use between pieces of a grid name. The default is an underscore.
- GRID_CREATE_FOLDERS - specifies that a separate folder should be generated for each row (or column if GRID_NAMING=SEPARATE_COLS_FIRST is specified) of the export rather than placing every output file in the same folder.
- QUALITY (*JPEG* or *GEOTIFF* only) - specifies the quality setting to use when generating the image. Valid values range from 1 to 100, with 1 generating the lowest quality image and 100 generating the highest quality image. If no QUALITY setting is present, a default value of 75 is used which generates a very high quality image that is still highly compressed. Note that if a different quality

value has been selected on the GeoTIFF export dialog in the user interface the last used value there will be the default.

- TARGET_COMPRESSION (*ECW* and *JPEG2000* only) - specifies the target compression ratio to use when creating the ECW image. The default value is 10 which strikes a good balance between image quality and compression. The higher the value, the smaller the resulting image will be at the expense of image quality.
- INC_VECTOR_DATA - specifies whether or not loaded vector data should be rendered and exported to the generated image. Use a value of YES to indicate that vector data should be used. Any other value will result in vector data NOT being saved to the file.
- FILL_GAPS - specifies that small gaps in between and within the data sets being exported will be filled in by interpolating the surrounding data to come up with a color for the point in question. This option is off by default, specify FILL_GAPS=YES to turn it on.
- POLYGON_CROP_FILE - specifies the full path and filename of a vector file containing a polygon feature to which the export should be cropped. If multiple polygons are found in the specified file the polygon which has the largest intersection with the data to be exported will be used as the crop polygon (see POLYGON_CROP_USE_ALL or POLYGON_CROP_USE_EACH for exceptions).
- POLYGON_CROP_NAME - specifies the name of a polygon shape previously defined using the DEFINE_SHAPE command to which the export should be cropped. The coordinates in the shape need to have been provided in whatever projection the export is being done in.
- POLYGON_CROP_USE_ALL - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the export will be cropped to all polygons in that file rather than just the best-fit polygon.
- POLYGON_CROP_USE_EACH - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the operation will generate a separate export for each polygons in that file rather than just the best-fit polygon. See the POLYGON_CROP_BBOX_ONLY and POLYGON_CROP_NAME_ATTR options for naming and other options when using this parameter. Use POLYGON_CROP_USE_EACH=YES to enable.
- POLYGON_CROP_BBOX_ONLY - specifies that if the POLYGON_CROP_USE_EACH parameter is specified that each export should just be cropped to the bounding box of each polygon rather than the actual boundary of the polygon. Use POLYGON_CROP_BBOX_ONLY=YES to enable only cropping to the bounding box.
- POLYGON_CROP_NAME_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use for naming, or the special values <Area Display Label> or <Area Source Filename>. If no value is provided, the exported files will be sequentially numbered.
- POLYGON_CROP_FOLDER_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use as a folder name before the actual filename or the special values <Area Display Label>.
- ONLY_GENERATE_METADATA (*GEOTIFF*, *JPEG*, and *PNG* only) - specifies that only metadata files like world files, TAB files, and PRJ files should be created for this file. This is useful for things like generating world and TAB files from GeoTIFF files without doing a whole new export. Just make the output filename the same as the loaded file to create the metadata for.
- COMPRESSION (GeoTIFF only)- specifies the type of compression to use for the generated TIFF file. If you do not provide a compression value the default compression for each type will be used. The following values are supported:
    - NONE - Do not compress the output.
    - LZW - Use LZW (lossless) compression on the output.
    - JPEG - Use JPEG-in-TIFF (lossy) compression. Only works for 24-bit RGB output. Use QUALITY parameter to set quality setting.

    - ♦ PACKBITS - Use Packbits (lossless) compression. Only works for 8-bit palette-based output.
    - ♦ DEFLATE - Use Deflate/ZIP (lossless) compression on the output.
- USE_LZW (*GEOTIFF* only) [DEPRECATED - use COMPRESSION instead]- specifies that LZW compression should be used for this RGB or palette-based GeoTIFF file. LZW compression typically results in much smaller files than the default compression, but there may be some software packages that do not yet support LZW-encoded GeoTIFF files. Specify USE_LZW=YES to enable LZW compression.
- TILE_SIZE (*GEOTIFF* only) - specifies that the GeoTIFF file should be exported with a tiled organization and use the specified tile size. This tile size should be between 8 and 2048. Typical values are 64, 128, and 256.
- SAVE_SCALE_AND_LEGEND - specifies that the distance scale and elevation legend, if applicable and enabled for display on the Configuration dialog, should be exported to the generated raster file. Specify SAVE_SCALE_AND_LEGEND=YES to enable this option.
- BG_TRANSPARENT (*ECW*, *GEOTIFF*, *JPEG2000* and *PNG* only) - specifies that any areas of no data/background should be marked as transparent. Use BG_TRANSPARENT=YES to enable.
- OVERWRITE_EXISTING - specifies that existing files should be overwritten. The default is OVERWRITE_EXISTING=YES, so use OVERWRITE_EXISTING=NO to skip exporting files that already exist.
- EXPORT_SCALE - specifies the scale to do the export at. You must also specify a DPI value in order to use the EXPORT_SCALE parameter. For example to export at 1:50,000 scale, use EXPORT_SCALE=50000.
- DPI (*GEOTIFF* and *JPG* only or with EXPORT_SCALE parameter) - specifies the DPI (dots per inch) value to save in the generated file(s). For example, use DPI=300 to specify that the DPI for this file is 300. By default no DPI value will be written out.
- KML_MIN_LOD_PIXELS (*KML* only) - specifies how large layer has to be in pixels before it will show up in Google Earth.
- KML_MAX_LOD_PIXELS (*KML* only) - specifies how large layer has to be in pixels before it will stop showing up in Google Earth. The default value of -1 which means that a layer will never go away once it is displayed.
- KML_FADE_EXTENT_MIN (*KML* only) - specifies at what number of pixels in size that the image will start fading out. This value should be between KML_MIN_LOD_PIXELS and KML_MAX_LOD_PIXELS. The fade will be such that the image is 100% opaque at KML_FADE_EXTENT_MIN and completely transparent at KML_MIN_LOD_PIXELS.
- KML_FADE_EXTENT_MAX (*KML* only) - specifies at what number of pixels in size that the image will start fading out. This value should be between KML_MIN_LOD_PIXELS and KML_MAX_LOD_PIXELS. The fade will be such that the image is 100% opaque at KML_FADE_EXTENT_MAX and completely transparent at KML_MAX_LOD_PIXELS.
- KML_RASTER_FORMAT (*KML* only) - specified which raster image format to use when creating tiles for KML/KMZ files. The valid options are JPG, PNG, and TIFF. For example, add KML_RASTER_FORMAT=JPG to use JPG format files.
- KML_SUPER_OVERLAY (*KML* only) - specifies that the data should be automatically gridded into "super overlays" to allow displaying large quantities of data in Google Earth. Use KML_SUPER_OVERLAY=YES to enable this behavior.
- KML_TILE_SIZE (*KML* only) - if data is being automatically gridded into "super overlays", this specifies the size of tiles to use for gridding. The default tile size is 1024. To change this for example to 512x512, use KML_TILE_SIZE=512.
- KML_ZOOM_SCALE_FACTOR (*KML* only) - if data is being automatically gridded into "super overlays", this specifies the multiplier to use when creating zoomed out pyramid layers. The default value of 2 makes each successive zoom level 1/2 the resolution of the previous one until everything fits in a single tile. To change this to making each layer 1/3rd the resolution of the previous one, use KML_ZOOM_SCALE_FACTOR=3.

- ADD_OVERVIEW_LAYERS (*ERDAS* only) - specifies that overview (pyramid) layers should be generated for the export. Use ADD_OVERVIEW_LAYERS=YES to enable.
- BLOCK_SIZE (*ERDAS* only) - specifies the block size to use for the export. The default is BLOCK_SIZE=64.
- COMPRESS_OUTPUT (*ERDAS* only) - specifies whether or not the exported file should be compress. The default is COMPRESS_OUTPUT=YES.
- DISABLE_BIGTIFF (*GEOTIFF* only) - use to disable the automatic creation of BigTIFF-format files for very large exports. Use DISABLE_BIGTIFF=YES to disable the automatic BigTIFF support.
- DPI - specifies the DPI (dots per inch) value to store in the generated file. For example, use DPI=300 to embed a DPI value of 300 in the generated file.

EXPORT_VECTOR

The EXPORT_VECTOR command exports all currently loaded vector data to a file. The following parameters are supported by the command.

- FILENAME - full path to file to save the data to
- TYPE - type of vector file we're exporting to
    - ♦ ARC_UNGENERATE - export line and area features to an Arc Ungenerate format file.
    - ♦ ARC_UNGENERATE_POINTS - export point features to an Arc Ungenerate format file.
    - ♦ CDF - export to a Geographix CDF format file.
    - ♦ CSV - export point features to a CSV format file.
    - ♦ DELORME_DRAWING - export features to a DeLorme drawing text file
    - ♦ DELORME_TRACK - export line features to a DeLorme track text file
    - ♦ DELORME_WAYPOINT - export point features to a DeLorme waypoint text file
    - ♦ DGN - export to a DGN v8 file.
    - ♦ DLGO - export to a native format USGS DLG-O file.
    - ♦ DWG - export to an AutoCAD DWG format file.
    - ♦ DXF - export to an AutoCAD DXF format file.
    - ♦ GARMIN_TRK - exports lines to a Garmin TRK (PCX5) format file.
    - ♦ GARMIN_WPT - exports names points to a Garmin WPT (PCX5) format file.
    - ♦ GPX - exports line and point features to a GPX (GPS eXchange Format) file.
    - ♦ KML - export to a KML or KMZ format file.
    - ♦ LANDMARK_GRAPHICS - export to a Landmark Graphics format file.
    - ♦ LIDAR_LAS - export to a Lidar LAS file.
    - ♦ LOWRANCE_USR - export to a Lowrance USR format file.
    - ♦ MAPGEN - export to a MapGen format file.
    - ♦ MAPINFO - export to a MapInfo MIF/MID or TAB/MAP format file.
    - ♦ MATLAB - export to a MatLab format file.
    - ♦ MOSS - export line and area features to a MOSS format file.
    - ♦ NIMA_ASC - export to a NIMA ASC format file.
    - ♦ PLATTE_RIVER - export to a Platte River ASCII Digitizer format file.
    - ♦ POLISH_MP - export to a Polish MP format file.
    - ♦ SEGP1 - export to a SEGP1 format file.
    - ♦ SHAPEFILE - export to an ESRI Shapefile format file.
    - ♦ SIMPLE_ASCII - export to a simple ASCII text file.
    - ♦ SURFER_BLN - export to a Surfer BLN format file.
    - ♦ SVG - export to a Scalable Vector Graphic (SVG) format file.
    - ♦ TSUNAMI_OVR - export to a Tsunami OVR format file.

    - WASP_MAP - export to a WAsP .map format file (line features only).
    - ZMAP_XYSEGID - export to a ZMap+ XYSegId format file (area and line features only).
- GLOBAL_BOUNDS - specifies the export bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, maximum x, maximum y.
- GLOBAL_BOUNDS_SIZE - specifies the export bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, width in x, width in y.
- LAT_LON_BOUNDS - specifies the export bounds in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.
- LAYER_BOUNDS - specifies that the export should use the bounds of the loaded layer(s) with the given filename. For example, to export to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.
- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.
- QUAD_NAME (*DLGO* only) - specifies the quadrangle name to store in the header of the DLG-O file. If not quadrangle name is specified, Global Mapper will attempt to automatically determine one based on the loaded data.
- EXPORT_DWG_LABELS (*DWG* only) - specifies that object labels will be exported as attributes in the DWG file. Typically you want to set this to YES, unless you are working with a software package that cannot handle DWG files with attributes. Leaving out this parameter or setting it to anything but YES will cause feature labels to be discarded on export.
- EXPORT_DXF_LABELS (*DXF* only) - specifies that object labels will be exported as attributes in the DXF file. Typically you want to set this to YES, unless you are working with a software package that cannot handle DXF files with attributes. Leaving out this parameter or setting it to anything but YES will cause feature labels to be discarded on export.
- DWG_TEXT_SIZE (*DWG* only) - specifies the multiplier value to apply to text sizes when exporting DWG file. Use this to control how large text is in the exported file.
- DXF_TEXT_SIZE (*DXF* only) - specifies the multiplier value to apply to text sizes when exporting DXF file. Use this to control how large text is in the exported file.
- SHAPE_TYPE (*SHAPEFILE* only) - specifies the vector object type (area, line, or point) to export to the shapefile. The following values are valid:
    - AREAS - export area features to the Shapefile
    - LINES - export line features to the Shapefile
    - POINTS - export point features to the Shapefile
- GEN_PRJ_FILE - specifies that a projection (PRJ) file should be generated in addition to the output file. Set this to YES to cause the projection file to be generated. Leaving out this parameter or setting it to anything but YES will cause no PRJ file to be generated.
- GRID_TYPE_CELL_SIZE - specifies that the export should be gridded into multiple tiles with each tile having the given size in the export projection. The value should be specified as *cell width*,*cell height*. For example, if you are exporting in a metric projection and want to tile the export into cells that are 10,000 meters wide by 5,000 meters tall, you would use GRID_TYPE_CELL_SIZE="10000.0,5000.0".
- GRID_TYPE_ROWS_COLS - specifies that the export should be gridded into multiple tiles with a given number of rows and columns of tiles. The value should be specified as *number of rows*,*number*

of columns. For example, if you want to tile the export into a grid of 8 rows each 4 tiles across, you would use GRID_TYPE_ROWS_COLS="8,4".

- GRID_OVERLAP - specifies how much to overlap tiles when gridding an export into multiple tiles. This is a percentage value from 0 to 100 and only applies when on of the GRID_TYPE_* parameters is used. For example, to make your grid tiles overlap by 5% of the grid tile size, use GRID_OVERLAP="5.0". The default value is 0.0, meaning that the tiles do not overlap.
- GRID_NAMING - specifies how to name tiles when gridding an export into multiple tiles. The value should be SEQUENTIAL for sequential numeric naming starting at 1, SEPARATE for separate prefix appending by row and column, or SEPARATE_COLS_FIRST for separate prefix appending by columns and rows. For the SEPARATE options, use the GRID_NAMING_COLS and GRID_NAMING_ROWS parameters to specify the details of how to name the rows and columns. If no GRID_NAMING parameter is supplied, the last selected grid naming options selected in the user interface will be used.
- GRID_NAMING_COLS - specifies how to name the column portion of grid cell names when using the GRID_NAMING=SEPARATE or GRID_NAMING=SEPARATE_COLS_FIRST parameter. The value of this field is a comma-delimited list with the following field values:
    - *Naming type*. Can have the following values:
        - NUM - name using numbers in ascending order
        - NUM_REVERSE - name using numbers in descending order
        - ALPHA - name using letters in ascending order
        - ALPHA_REVERSE - name using letters in descending order
    - *Starting value* for numbering or lettering (i.e. '1', or 'A').
    - *Prefix string* to use before the numeric or alphabetic value.
    - *Step value* for numeric naming (default is '1')

  You can leave values blank if they don't apply or you want to use the default. As an example, to do numeric naming starting at the number 100, increasing by 10 each time with a prefix of DEM, you would use GRID_NAMING_COLS="NUM,100,DEM,10".
- GRID_NAMING_ROWS - specifies how to name the row portion of grid cell names when using the GRID_NAMING=SEPARATE parameter. See the documentation for the GRID_NAMING_COLS parameter above for details on the format.
- GRID_NAMING_PREPEND_ZEROES - specifies whether or not to prepend zeroes to the start of grid column/row names. Use GRID_NAMING_PREPEND_ZEROES=NO to disable the prepending of zeroes.
- GRID_NAMING_SEPARATOR - specifies the separator string to use between pieces of a grid name. The default is an underscore.
- GRID_CREATE_FOLDERS - specifies that a separate folder should be generated for each row (or column if GRID_NAMING=SEPARATE_COLS_FIRST is specified) of the export rather than placing every output file in the same folder.
- GEN_3D_FEATURES (*DGN* and *SHAPEFILE* only) - specifies that 3D line and point objects should be created in the exported file. Set this to YES to cause the the 3D features to be generated. Leaving out this parameter or setting it to anything but YES results in the normal 2D objects. The elevation stored for each vertex/point will be the first of the following that is available:
    - The elevation associated with the vertex/point in question.
    - The elevation associated with the entire area/line/point being exported. For example, the elevation of a contour line or spot elevation.
    - The first elevation obtained by searching the loaded elevation layers at the position of the vertex/point.

  A value of 0.0 will be used if no elevation could be obtained via any of the prior methods.
- COORD_DELIM (*SIMPLE_ASCII* only) - specifies the delimeter between coordinates in coordinate lines
    - COMMA - coordinates are separated by commas

    - SEMICOLON - coordinates are separated by semicolons
    - SPACE - coordinates are separated by space characters
    - TAB - coordinates are separated by tab characters
- FEATURE_SEP (*SIMPLE_ASCII* only) - specifies whether or not to separate vector features with a blank line
    - NONE - do not separate vector features
    - BLANK_LINE - separate vector features with a blank line
    - Any other text. Use the escape sequence \n to specify that you want to insert a line break. For example, to separate features with a blank line, then a line with the text "NEW FEATURE", then another blank line, use FEATURE_SEP="\nNEW FEATURE\n".
- EXPORT_ELEV (*SIMPLE_ASCII*, *CSV*, and *DXF* only) - specifies whether or not a elevation value should be generated for each vertex. A value of EXPORT_ELEV=YES will cause elevations to be generated. If the option is not specified, elevation values will be generated.
- EXPORT_ATTRS (*DGN* and *SIMPLE_ASCII* only) - specifies whether or not feature attributes should be written to the text file just before the coordinates. Use EXPORT_ATTRS=YES to enable export of the feature attributes. If the option is not specified, attributes will be exported. If you don't want to export style attribute with the feature, use EXPORT_ATTRS=NO_STYLE to get just the associated attributes and name of the feature in the attribute list.
- COORD_OFFSET (*SIMPLE_ASCII* only) - specifies the offset to apply to any coordinates written to the file. This offset will be added to each coordinate written to the file. The offset should be specified as a comma-delimited list of the X, Y, and Z offsets, such as COORD_OFFSET=100000.0,200000.0,0.0
- COORD_SCALE (*SIMPLE_ASCII* only) - specifies the scale factors to apply to any coordinates written to the file. Each coordinate will be multiplied by these scale factor before being written to the file. The scale factors should be specified as a comma-delimited list of the X, Y, and Z scale factors, such as COORD_SCALE=0.1,0.1,1.0
- CDF_MAJOR_CODE (*CDF* only) - specifies the default major attribute code to use for features when exporting to a CDF format file (default is 32).
- CDF_MINOR_CODE (*CDF* only) - specifies the default minor attribute code to use for features when exporting to a CDF format file (default is 45).
- CDF_USE_DEFAULT_CODE (*CDF* only) - specifies that the default attribute code pair should be used for all features written to the CDF file and not just those for which no attribute code pair could be automatically determined based on the feature classification.
- INC_ELEV_ATTR (*MAPINFO* only) - specifies whether or not the elevation of a feature should be added as an attribute to the MapInfo files exported. Use INC_ELEV_ATTR=YES to enable or INC_ELEV_ATTR=NO to disable. This is enabled by default.
- INC_LAYER_ATTR (*SHAPEFILE, MAPINFO, or KML* only) - specifies whether or not the layer (description) of a feature should be added as an attribute to the DBF files exported with the Shapefile or for KML files whether or not displays labels should be exported for line and area features. Use INC_LAYER_ATTR=YES to enable or INC_LAYER_ATTR=NO to disable. This is enabled by default for Shapefile and MapInfo exports and disabled by KML.
- INC_MAP_NAME_ATTR (*SHAPEFILE* only) - specifies whether or not the name of the map file that a feature came from should be added as an attribute to the DBF files exported with the Shapefile. Use INC_MAP_NAME_ATTR=YES to enable.
- POLYGON_CROP_FILE - specifies the full path and filename of a vector file containing a polygon feature to which the export should be cropped. If multiple polygons are found in the specified file the polygon which has the largest intersection with the data to be exported will be used as the crop polygon (see POLYGON_CROP_USE_ALL and POLYGON_CROP_USE_EACH for exceptions). Note that line and area features will only be cropped to the bounds of the specified polygon. Point features from some formats will actually be cropped to the specified polygon boundary.

- POLYGON_CROP_NAME - specifies the name of a polygon shape previously defined using the DEFINE_SHAPE command to which the export should be cropped. The coordinates in the shape need to have been provided in whatever projection the export is being done in.
- POLYGON_CROP_USE_ALL - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the export will be cropped to all polygons in that file rather than just the best-fit polygon.
- MAP_NAME (*POLISH_MP* only) - specifies the map name for the MP file.
- POLYGON_CROP_USE_EACH - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the operation will generate a separate export for each polygons in that file rather than just the best-fit polygon. See the POLYGON_CROP_BBOX_ONLY and POLYGON_CROP_NAME_ATTR options for naming and other options when using this parameter. Use POLYGON_CROP_USE_EACH=YES to enable.
- POLYGON_CROP_BBOX_ONLY - specifies that if the POLYGON_CROP_USE_EACH parameter is specified that each export should just be cropped to the bounding box of each polygon rather than the actual boundary of the polygon. Use POLYGON_CROP_BBOX_ONLY=YES to enable only cropping to the bounding box.
- POLYGON_CROP_NAME_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use for naming, or the special values <Area Display Label> or <Area Source Filename>. If no value is provided, the exported files will be sequentially numbered.
- POLYGON_CROP_FOLDER_ATTR - used to control the filenames generated when cropping to multiple polygons using the POLYGON_CROP_USE_EACH parameter. This should be the actual name of the attribute from the polygon features to use as a folder name before the actual filename or the special values <Area Display Label>.
- TEMPLATE_FILENAME (*POLISH_MP* only) - specifies the full path and filename for another MP file to use for the settings for the new MP file being exported.
- MP_EXPORT_TEMPLATE_FILES (*POLISH_MP* only) - if a TEMPLATE_FILENAME value is provided, this controls whether or not the [FILES] section(s) from the template file will be copied to the new file.
- MP_COPY_ENTIRE_TEMPLATE (*POLISH_MP* only) - specifies that the entire contents of a specified template file should be copied to the new file rather than just the header portion of the template file.
- MP_IMAGE_ID (*POLISH_MP* only) - specifies the image ID value that should be stored in the resultant .mp file. If you don't specify this value or you specify a value of 0 a new value that has not been used before will automatically be generated.
- DGN_UNIT_RESOLUTION (*DGN* only) - specifies the unit resolution to use in an exported DGN file. The default is 10000.0.
- DGN_GLOBAL_ORIGIN_LL (*DGN* only) - specifies whether the global origin of the exported DGN file should be set to the lower left of the design plane rather than at the center of the design plane. Use DGN_GLOBAL_ORIGIN_LL=YES to move the global origin to the lower left.
- DGN_REPLACE_DARK_COLORS (*DGN* only) - specifies whether the color of dark lines should automatically be replaced with white on export to make them more visible on a dark background. Use DGN_REPLACE_DARK_COLORS=YES to enable this option.
- OVERWRITE_EXISTING - specifies that existing files should be overwritten. The default is OVERWRITE_EXISTING=YES, so use OVERWRITE_EXISTING=NO to skip exporting files that already exist.
- SPLIT_BY_LAYER (*SHAPEFILE* only) - specifies that the export should generate a separate Shapefile for each layer/type in the input data
- SPLIT_BY_ATTR - specifies that the export should generate a separate file for each set of attributes values in the input data. Use the FILENAME_ATTR and/or FILENAME_ATTR_LIST and

FILENAME_INCLUDE_ATTR_NAME parameters to control which attributes are compared to and in what order and how the filename is generated from those attributes and their values. Use SPLIT_BY_ATTR=YES to split your export so that all features with the same values for each of the specified attributes is in the same file.

- FILENAME_ATTR_LIST - contains a comma-delimited list of attributes to use when naming files exported when using the SPLIT_BY_ATTR=YES parameter. If you would like to filter the results to only where an attribute has a specified value, do that with an equal sign, like FILENAME_ATTR_LIST="<Feature Name>=My Label,ATTR_1=My Attr Val". You can also use != rather than = to match on any feature with an attribute value not equal to the specified value. If you need to match on a value that may contain a comma, use FILENAME_ATTR instead.
- FILENAME_ATTR - contains a single attribute to use when naming files exported when using the SPLIT_BY_ATTR=YES parameter. If you would like to filter the results to only where an attribute has a specified value, do that with an equal sign, like FILENAME_ATTR="<Feature Name>=My Label". You can also use != rather than = to match on any feature with an attribute value not equal to the specified value.
- FILENAME_INCLUDE_ATTR_NAME - specifies that the attribute name specified in the FILENAME_ATTR_LIST parameter should be included as part of the filename when using SPLIT_BY_ATTR=YES to split your export into a separate file for each set of attributes.
- KML_AREA_DISPLAY_ABOVE_TERRAIN (*KML* only) - specifies that area features with associated elevation value should be displayed at height above the terrain surface in Google Earth. Use KML_AREA_DISPLAY_ABOVE_TERRAIN=YES to enable.
- KML_AREA_ELEVS_RELATIVE (*KML* only) - specifies that the elevation values associated with 3D area features are relative to the terrain surface rather than relative to sea level. Use KML_AREA_ELEVS_RELATIVE=YES to enable.
- KML_AREA_EXTRUDE (*KML* only) - specifies that 3D area features displayed in Google Earth should be extruded from the surface to create volumetric objects like buildings. Use KML_AREA_EXTRUDE=YES to enable.
- KML_AREA_FAKE_HEIGHTS (*KML* only) - specifies that fake elevation values should be assigned to area features exported to ensure that the draw order remains correct in Google Earth. This may be necessary to keep overlapping area features drawing correctly. Use KML_AREA_FAKE_HEIGHTS=YES to enable.
- KML_AREA_TRANSLUCENCY (*KML* only) - specifies how see-through filled area features will be in the generated KML file. The values should range from 1 to 100 and represent a opacity percentage, with 100 being completely opaque and 1 being almost completely transparent. The default value is KML_AREA_TRANSLUCENCY=75.
- KML_FOLDER_ATTR (*KML* only) - specifies the name of a feature attribute to use for the folder name in the generated KML file. By default, the export will check for a KML_FOLDER attribute with the name of a folder to use.
- KML_HTML_DESC_TEXT (*KML* only) - specifies a HTML text string describing what to use for the description for each feature exported to a KML file. To add a quote mark inside your description text, use two single quotes (') rather than a double quote ("), as the latter would terminate the parameter value.
- KML_LINE_DISPLAY_ABOVE_TERRAIN (*KML* only) - specifies that LINE features with associated elevation value should be displayed at height above the terrain surface in Google Earth. Use KML_LINE_DISPLAY_ABOVE_TERRAIN=YES to enable.
- KML_LINE_ELEVS_RELATIVE (*KML* only) - specifies that the elevation values associated with 3D line features are relative to the terrain surface rather than relative to sea level. Use KML_LINE_ELEVS_RELATIVE=YES to enable.
- KML_POINT_DISPLAY_ABOVE_TERRAIN (*KML* only) - specifies that point features with associated elevation value should be displayed at height above the terrain surface in Google Earth. Use KML_POINT_DISPLAY_ABOVE_TERRAIN=YES to enable.

- KML_POINT_ELEVS_RELATIVE (*KML* only) - specifies that the elevation values associated with 3D Point features are relative to the terrain surface rather than relative to sea level. Use KML_POINT_ELEVS_RELATIVE=YES to enable.
- KML_POINT_EXTRUDE (*KML* only) - specifies that 3D point features displayed in Google Earth should be extruded from the surface by drawing a thin line from the surface to the point. Use KML_POINT_EXTRUDE=YES to enable.
- GEN_MULTI_PATCH (*SHAPEFILE* only) - specifies that area features exported to a Shapefile should be stored as multi-patch features rather than areas. Use GEN_MULTI_PATCH=YES to enable.
- ADD_LAT_LON (*CSV* only) - specifies that lat/lon columns should be added to a CSV export. Use ADD_LAT_LON=YES to enable.
- VERSION (*LOWRANCE_USR* only) - specifies which version of USR file to create. Must be 3 or 4. By default VERSION=3 is used.

GENERATE_CONTOURS

The GENERATE_CONTOURS command allows for the generation of contour lines (isolines of equal elevation) from any or all currently loaded elevation data. The following parameters are supported by the command.

- ELEV_UNITS - specify elevation units to use in export
  - ♦ FEET - export in US feet
  - ♦ METERS - export in meters
- INTERVAL - specifies the contour interval to use. This must be a whole number greater than 0. The units are specified with the ELEV_UNITS parameter described above. If you wanted to generate a contour file with an interval of 20 feet, you would use INTERVAL=20 ELEV_UNITS=FEET in the parameter list. If no interval is provided, a default one is guessed based on the elevation range of the loaded elevation data.
- SPATIAL_RES - specifies spacing of grid points used to determine contour position. A smaller grid spacing results in higher fidelity, but larger, contours. Typically you'll want to use the default value which is the minimum spatial resolution of all loaded data. Should be formatted as x_resolution,y_resolution. The units are the units of the current global projection. For example, if UTM was the current global projection and you wanted to use a grid with a 30 meter spacing, the parameter/value pair would look like SPATIAL_RES=30.0,30.0.
- SPATIAL_RES_METERS - specifies spatial resolution to use in meters. The value in meters will automatically be converted to the curent view/export projection units. For example, to do an export at 2.0 meter spacing (or as close as you can get to that in the current units), use SPATIAL_RES_METERS=2.0, or to do an export at 1.0 meters in X by 1.5 meters in Y, use SPATIAL_RES_METERS="1.0,1.5".
- GLOBAL_BOUNDS - specifies the contour bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, maximum x, maximum y.
- GLOBAL_BOUNDS_SIZE - specifies the contour bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, width in x, width in y.
- LAT_LON_BOUNDS - specifies the contour bounds in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.

- LAYER_BOUNDS - specifies that the contour generation should use the bounds of the loaded layer(s) with the given filename. For example, to generate contours to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.
- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.
- SIMPLIFICATION - specifies the simplification threshold to use when generating the contours. This specifies how far off a straight line (in the units of the current projection) that a point has to be before it is kept. Generally you should not specify a simplification value as the default value of one tenth of the sample spacing works quite well. This is an option for advanced users only.
- GEN_HEIGHT_AREAS - generate area features colored based on the current elevation shader in addition to generating contour lines. Use a value of YES to enable the generate of the height areas.
- GEN_SPOT_ELEVATIONS - generate spot elevations at min/max elevations. Use a value of YES to enable the generate of min/max spot elevation points.
- SINGLE_LEVEL_ONLY - specifies that the INTERVAL value is actually a value indicating the only height that a contour should be generated at. Use a value of YES to turn this functionality on.
- FILL_GAPS - specifies that small gaps in between and within the data sets being used to generate the contours will be filled in by interpolating the surrounding data to come up with an elevation for the point in question. This option is on by default, specify FILL_GAPS=NO to turn off.
- LAYER_DESC - specifies the name to assign to this layer. If no layer description is provided, the default name of "GENERATED CONTOURS" will be used.
- INC_UNIT_SUFFIX - specifies whether or not a unit suffix (either "m" or "ft") should be appended to the numeric label of generated features. By default this is enabled, so specify INC_UNIT_SUFFIX=NO to turn unit suffixes off. This is useful if the data the contours are being generated over doesn't actually represent elevation.
- SMOOTH_CONTOURS - specifies whether or not generated contour line and area features should have smoothing applied to improve appearance. This option is enabled by dfault. Use SMOOTH_CONTOURS=NO to disable smoothing.
- POLYGON_CROP_FILE - specifies the full path and filename of a vector file containing a polygon feature to which the operation should be cropped. If multiple polygons are found in the specified file the polygon which has the largest intersection with the data to be combined will be used as the crop polygon (see POLYGON_CROP_USE_ALL or POLYGON_CROP_USE_EACH for exceptions).
- POLYGON_CROP_NAME - specifies the name of a polygon shape previously defined using the DEFINE_SHAPE command to which the export should be cropped. The coordinates in the shape need to have been provided in whatever projection the new terrain layer will be in (i.e. the current projection).
- POLYGON_CROP_USE_ALL - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the operation will be cropped to all polygons in that file rather than just the best-fit polygon.
- POLYGON_CROP_BBOX_ONLY - specifies that if the POLYGON_CROP_USE_EACH parameter is specified that each export should just be cropped to the bounding box of each polygon rather than the actual boundary of the polygon. Use POLYGON_CROP_BBOX_ONLY=YES to enable only cropping to the bounding box.

GENERATE_ELEV_GRID

The GENERATE_ELEV_GRID command allows for the generation of a gridded elevation layer using loaded 3D vector data. The following parameters are supported by the command as well as the display option paramters supported by the IMPORT command.

- ELEV_UNITS - specify elevation units to use for new grid
  - FEET - US feet
  - DECIFEET - 10ths of US feet
  - METERS - meters
  - DECIMETERS - 10ths of meters
  - CENTIMETERS - centimeters
- SPATIAL_RES - specifies spacing of grid points to use in generated grid. A smaller grid spacing results in higher fidelity, but larger, elevation grids. Should be formatted as x_resolution,y_resolution. The units are the units of the current global projection. For example, if UTM was the current global projection and you wanted to use a grid with a 30 meter spacing, the parameter/value pair would look like SPATIAL_RES=30.0,30.0. If you do not provide a SPATIAL_RES value, a good default for the input data will be chosen, so in most cases it is best just to leave this off.
- SPATIAL_RES_METERS - specifies spatial resolution to use in meters. The value in meters will automatically be converted to the curent view/export projection units. For example, to do an export at 2.0 meter spacing (or as close as you can get to that in the current units), use SPATIAL_RES_METERS=2.0, or to do an export at 1.0 meters in X by 1.5 meters in Y, use SPATIAL_RES_METERS="1.0,1.5".
- GLOBAL_BOUNDS - specifies the grid bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, maximum x, maximum y.
- GLOBAL_BOUNDS_SIZE - specifies the grid bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, width in x, width in y.
- LAT_LON_BOUNDS - specifies the grid bounds in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.
- LAYER_BOUNDS - specifies that the grid generation should use the bounds of the loaded layer(s) with the given filename. For example, to generate contours to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.
- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.
- LAYER_DESC - specifies the name to assign to this layer. If no layer description is provided, a default name will be assigned.
- NO_DATA_DIST_MULT - specifies how far from an actual data point a grid cell has to be before it is treated as a no data value. This number is given as a multiple of the diagonal size of a single grid cell as nominally determined by the gridding algorithm or specified with the SPATIAL_RES parameter. A value of 0 (the default) means that all points should be considered as valid.
- GRID_FILL_TO_BOUNDS - specifies that the grid values should be filled out to the entire bounds of the gridded data rather than just to the convex hull of the data being gridded. Use GRID_FILL_TO_BOUNDS=YES to enable this.

- GRID_FLATTEN_AREAS - specifies that area features with elevation values should be flattened to the elevation of the area features. Use GRID_FLATTEN_AREAS=NO to disable this.
- GRID_HEIGHTS_RELATIVE - specifies that the elevation values for the input vector features should be treated as relative to any loaded terrain data rather than as absolute elevation values. This useful for things like trees or buildings where you have a height above the ground rather than an absolute height. Use GRID_HEIGHTS_RELATIVE=YES to enable this.
- GRID_SAVE_TIN - specifies that the triangulated irregular network (TIN) for the grid operation should be saved as a new separate vector layer consisting of triangular 3D area features. Use GRID_SAVE_TIN=YES to enable this.
- GRID_USE_CONSTRAINTS - specifies that 3D line and area features should be treated as constraints (breaklines) during the gridding process. Use GRID_USE_CONSTRAINTS to enable this.
- GRID_IGNORE_ZERO - specifies that features with an elevation of 0.0 will not be used during the gridding process.

GENERATE_EQUAL_VAL_AREAS

The GENERATE_EQUAL_VAL_AREAS command allows for the generation of areas for regions of the same (or similar) color or elevation values fro a loaded raster or elevation layer.

- FILENAME - specifies the filename of the already loaded layer from which to generate the equal-value areas.
- LAYER_DESC - specifies the description to use for the layer
- ATTR_NAME - specifies the name to use for the attribute holding the color or elevation that a particular area represents. If you leave this attribute off then no value attribute will be saved with each area.
- AREA_TYPE - specifies the name of the area type to assign to the area features. See the Area Styles tab of the Configuration dialog for a list of available type names.
- COLOR_DIST - specifies how far from an exact match each color channel of a color value must be to be considered the same. By default a value of 0 is used which means exact matches only. If you want to break the entire color range into say 4 ranges for each color channel, use something like COLOR_DIST=32 as that would allow colors up to 32 away from each color channel value to match to a color.
- ELEV_DIST - specifies how far from an exact match (in meters) each value must be to be considered the same. By default a value of 0 is used which means exact matches only. If you want to say split into area groups 10 meters in size, use ELEV_DIST=5. This would give you areas with values between -5 and 5 meters, 5 and 15 meters, etc.
- GLOBAL_BOUNDS - specifies the bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, maximum x, maximum y.
- GLOBAL_BOUNDS_SIZE - specifies the bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, width in x, width in y.
- LAT_LON_BOUNDS - specifies the bounds in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.
- LAYER_BOUNDS - specifies that the area generation should use the bounds of the loaded layer(s) with the given filename. For example, to generate contours to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.

- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.

SAMPLE:

This sample will generate equal-elevation areas of size 20 meters (10 meters on either side) from the specified DEM layer and store the elevation values in an attribute named ELEV for each area feature.

```
GENERATE_EQUAL_VAL_AREAS FILENAME="C:\temp\export test\blue_springs_4_quads.dem" ELEV_DIST=10.0
```

GENERATE_LAYER_BOUNDS

The GENERATE_LAYER_BOUNDS command create a new layer with a single bounding box area created from the bounding box of each loaded layer.

- LAYER_DESC - specifies the description to use the for created layer

---

GENERATE_PATH_PROFILE

The GENERATE_PATH_PROFILE command allows for the saving of a 3D path profile to an ASCII XYZ file. This command uses loaded elevation data to generate a list of the 3D coordinates between two given points in the given elevation units. The following parameters are supported by the command.

- FILENAME - full path to XYZ ASCII file to save the data to
- ELEV_UNITS - specify elevation units to use in export
  - ♦ FEET - export in US feet
  - ♦ METERS - export in meters
- POINT_COUNT - specifies the number of points to generate in the path. This must be at least two. For example, to create 1000 points, use POINT_COUNT=1000. You can use the POINT_SPACING parameter rather than this to specify how far apart sample points should be.
- POINT_SPACING - specifies the point spacing in meters to use between sample points along the path. For example, to create points spaced 10 meters apart, use POINT_SPACING=10.0.
- START_POS - specifies the start position for the path profile. The coordinates must be given in the current global coordinate system. For example, if UTM if the current projection, you might specify and easting/northing as follows: START_POS=480000,4310000.
- END_POS - specifies the end position for the path profile. The coordinates must be given in the current global coordinate system. For example, if UTM if the current projection, you might specify and easting/northing as follows: START_POS=480000,4310000.
- ADD_LAND_USE_CODES - specifies whether to query loaded LULC data sets for the land use code at each point and to include that land use code after the elevation. Use ADD_LAND_USE_CODES=YES to turn on adding land use codes for each point.
- APPEND_TO_FILE - specifies that the elevations between the start and end locations should be appended to the file specified if it already exists rather than a new file being created

- SAVE_DIST_Z_FILE - specifies that the output file should contain distance and elevation values rather than XYZ coordinate values. Use SAVE_DIST_Z_FILE=YES to enable this option.

GLOBAL_MAPPER_SCRIPT

The GLOBAL_MAPPER_SCRIPT must be the first command in the file. The only parameter supported is the VERSION parameter. Typically, the entire command line will look like:

```
GLOBAL_MAPPER_SCRIPT VERSION=1.00
```

You can use the following parameters with this command:

- VERSION - specifies the version of the scripting language used. This parameter is required. You should always use VERSION=1.00.
- ENABLE_PROGRESS - specifies whether or not any progress dialogs should be displayed while this script is processing. This is enabled by default. Use ENABLE_PROGRESS=NO to disable the display of any progress dialogs during the processing of this script.
- REQUIRE_WORKSPACE - name of workspace file that is required to be loaded for this script to run. If a name is provided for this parameter and that workspace is not currently loaded into Global Mapper, the script will immediately abort. This can be used if you have different scripts that you only want to use if other workspaces are active and want to prevent accidentally selecting the wrong script.

GENERATE_REPORT

The GENERATE_REPORT command allows you to generate a CSV text report file on the data in one or more loaded layers broken down by a particular attribute value, feature name, or type, or just a single line report about all features. The report will include the count of area, line, and point features matching the specified criteria as well as the total combined length of the line features and combined covered area of the area features.

The following parameters are supported by the command:

- OUTPUT_FILENAME - specifies the name of the text .csv file to write the report results to.
- FILENAME - filename of the layer to generate the report for. If an empty value is passed in, all layers that were created by the script, such as those from a GENERATE_CONTOURS command, will be used to generate the report. You can also pass in the value 'USER CREATED FEATURES' when running a script in the context of the main map view or loading a workspace to have the 'User Created Features' layer be used. If no FILENAME parameter is provided, the report will cover all available vector layers.
- REPORT_ATTR - specifies what to use to divide up the report into categories. This can be an attribute name, or if you would like to compare against a feature label rather than an attribute, use <Feature Name>. To compare against a feature type name rather than an attribute, use <Feature Type> for your attribute name. To compare against the feature description, use <Feature Desc> for your attribute name. If no REPORT_ATTR parameter is provided or the value is empty, only a single line concerning all matching features will be generated in the report.
- COMPARE_STR - specifies a comparison operation to perform to see if a feature is one that needs to be included in the report. The format is attr_name=attr_value. For example if you have an attribute named CFCC and you want to match when the value of that attribute starts with an 'A', you can use

COMPARE_STR="CFCC=A*" as your parameter. You can add multiple COMPARE_STR parameters to a single command to combine multiple criteria for your search. If you would like to compare against a feature label rather than an attribute, use <Feature Name> for your attribute name. To compare against a feature type name rather than an attribute, use <Feature Type> for your attribute name. To compare against the feature description, use <Feature Desc> for your attribute name.

- CASE_SENSITIVE - specifies whether or not text comparisons are case sensitive or not. Use CASE_SENSITIVE=YES to enable, by default comparisons are not case sensitive.

GENERATE_WATERSHED

The GENERATE_WATERSHED command allows for the generation of a watershed, including stream flow and optionally watershed areas for each stream segment. The following parameters are supported by the command.

- STREAM_THRESHOLD - specifies the number of cells that have to drain to a particular location before that location is considered to be part of the stream network.
- MAX_DEPTH - specifies the maximum depression depth (in meters) that will be filled prior to calculating the watershed. This is needed to prepare a terrain surface for flow analysis so that a continuous flow can be found. Note that while using a large MAX_DEPTH value may generate better results, it could also cause the process to take a lot longer.
- GEN_AREAS - generate watershed area features for each found stream segment outlining the area that drains into that stream. Enabled by default, use GEN_AREAS=NO to disable.
- SMOOTH_STREAMS - specifies whether or not generated streams should have smoothing applied to improve appearance. This option is enabled by default. Use SMOOTH_STREAMS=NO to disable smoothing.
- SPATIAL_RES - specifies spacing of grid points used to calculate the watershed. A smaller grid spacing results in higher fidelity, but the calculation process will take longer. Typically you'll want to use the default value which is the minimum spatial resolution of all loaded data. Should be formatted as x_resolution,y_resolution. The units are the units of the current global projection. For example, if UTM was the current global projection and you wanted to use a grid with a 30 meter spacing, the parameter/value pair would look like SPATIAL_RES=30.0,30.0.
- SPATIAL_RES_METERS - specifies spatial resolution to use in meters. The value in meters will automatically be converted to the curent view/export projection units. For example, to do an export at 2.0 meter spacing (or as close as you can get to that in the current units), use SPATIAL_RES_METERS=2.0, or to do an export at 1.0 meters in X by 1.5 meters in Y, use SPATIAL_RES_METERS="1.0,1.5".
- GLOBAL_BOUNDS - specifies the contour bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, maximum x, maximum y.
- GLOBAL_BOUNDS_SIZE - specifies the contour bounds in units of the current global projection. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of minimum x, minimum y, width in x, width in y.
- LAT_LON_BOUNDS - specifies the contour bounds in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.
- LAYER_BOUNDS - specifies that the contour generation should use the bounds of the loaded layer(s) with the given filename. For example, to generate contours to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.

- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.
- FILL_GAPS - specifies that small gaps in between and within the data sets being used to generate the watershed will be filled in by interpolating the surrounding data to come up with an elevation for the point in question. This option is on by default, specify FILL_GAPS=NO to turn off.
- LAYER_DESC - specifies the name to assign to this layer. If no layer description is provided, the default name of "GENERATED WATERSHED" will be used.
- POLYGON_CROP_FILE - specifies the full path and filename of a vector file containing a polygon feature to which the operation should be cropped. If multiple polygons are found in the specified file the polygon which has the largest intersection with the data to be combined will be used as the crop polygon (see POLYGON_CROP_USE_ALL or POLYGON_CROP_USE_EACH for exceptions).
- POLYGON_CROP_NAME - specifies the name of a polygon shape previously defined using the DEFINE_SHAPE command to which the export should be cropped. The coordinates in the shape need to have been provided in whatever projection the new terrain layer will be in (i.e. the current projection).
- POLYGON_CROP_USE_ALL - specifies that if a POLYGON_CROP_FILE is specified that contains multiple polygons, the operation will be cropped to all polygons in that file rather than just the best-fit polygon.
- POLYGON_CROP_BBOX_ONLY - specifies that if the POLYGON_CROP_USE_EACH parameter is specified that each export should just be cropped to the bounding box of each polygon rather than the actual boundary of the polygon. Use POLYGON_CROP_BBOX_ONLY=YES to enable only cropping to the bounding box.

IMPORT

The IMPORT command imports a data file for later use. The following parameters are supported by the command.

- FILENAME - full path to file to load the data from. This can also be the URL (http: or ftp:) for a file on a web site that you want Global Mapper to download and load.
- TYPE - type of data file we're loading
    - ♦ AUTO - automatically determine the type (default).
    - ♦ ACE - Altimetry Corrected Elevation (ACE) format file.
    - ♦ ARCASCIIGRID - Arc ASCII Grid format file.
    - ♦ ARCBINARYGRID - Arc Binary Grid format file.
    - ♦ AVC - Arc Vector Coverage format file.
    - ♦ BIL - BIL format file.
    - ♦ BSB - BSB format file (usually has .KAP extension).
    - ♦ BT - a BT (Binary Terrain) format grid file.
    - ♦ CANADA3D - Canada 3D format file.
    - ♦ COMPEGPS - a CompeGPS RTE, TRK, or WPT file.
    - ♦ CTM_DEM - a CTM DEM format file.
    - ♦ DBF - DBase file with point features.
    - ♦ DHM25 - a Swiss DHM terrain format file.

- DLGO - USGS DLG-O
- DGN - MicroStation DGN files earlier than v8.
- DIVAGIS_GRID - a DIVA GIS grid format file.
- DMDF - a Digital Map Data Format (DMDF) format file.
- DOQQ - USGS DOQ in JPEG format.
- DTED - Digital Terrain Elevation Data (DTED) format.
- DXF - DXF format.
- ECW - ER Mapper Compressed Wavelet (ECW) format file.
- EMF - a Windows Enhanced Metafile (EMF) format file.
- ENVI DEM - ENVI DEM format file.
- ERDAS - Erdas Imagine format file.
- ERDAS_GIS - Erdas GIS format file.
- ERM_GRID - ERM grid format file.
- ESRI_PGEO - ESRI personal geodatabase format file.
- ETOPO2 - ETOPO2 format file.
- FAST_L7A - a Landsat FAST L7A format file.
- FLOATGRID - FLOAT/GRID format file.
- GEOSOFT_GRID - a Geosoft Binary Grid format file.
- GEOTIFF - GeoTIFF format file.
- GIF - a GIF format file with associated world file.
- GLOBAL_MAPPER_CATALOG - a Global Mapper Map Catalog file.
- GLOBAL_MAPPER_GRID - a Global Mapper Grid format file.
- GML - a GML format file.
- GNIS - Geographics Names Information Service (GNIS) file
- GPS_TRACKMAKER - a GPS TrackMaker format file.
- GXF - Geosoft Grid ASCII (GXF) file
- GPX - GPS eXchange Format file
- HDF - an HDF format raster or grid file, like ASTER DEM or ASTER VNIR imagery.
- HELAVA_DEM - a Helava DEM file
- HYPACK_MATRIX - a Hypack Matrix format file.
- IBCAO - Arctic bathymetry in NetCDF format.
- IDRISI_RASTER - Idrisi raster/elevation format file.
- INTERGRAPH_COT - Intergraph COT format file.
- JDEM - a Japanese DEM .mem file.
- JPEG - a JPEG file with an associated world file.
- JPEG2000 - a JPEG 2000 file
- KML - a KML/KMZ file.
- LIDAR_LAS - a LAS file with LIDAR data.
- LOWRANCE_USR - a Lowrance USR format file.
- LULC - USGS Land Use and Land Cover vector data file.
- MAPINFO - a MapInfo MIF/MID of TAB/MAP vector data collection.
- MAPMAKERTERRAIN - a MapMaker terrain file
- MARPLOT_MIE - a MarPlot MIE format file.
- MAPTECH - a MapTech BSB, Topo, or Aerial format file.
- MICRODEM_DEM - a MicroDEM-created DEM file
- MICROPATH_DEM - a Micropath DEM file
- MRSID - a LizardTech MrSID image file.
- NetCDF - a NetCDF format file.
- NIMA_GNS - a NIMA GNS format file.
- NITF - NITF format imagery
- NOS_GEO - a NOS/GEO format chart file.

- NTF_GRID - a NTF grid format file.
- OPTIMI_GRID - an Optimi terrain or clutter grid format file.
- OZI - an OziExplorer format waypoint (WPT) or track (PLT) file.
- PCX - a PC Paintbrush PCX format file.
- PCX5 - a Garmin PCX5 format waypoint (WPT) or track (TRK) file.
- ROCKWORKS_GRID - a RockWorks Grid format file.
- RPF - Raster Product Format database, like CADRG.
- RPF_FRAME - single frame from a Raster Product Format database, like CADRG.
- S57 - a S-57 chart file
- SDTS - a SDTS transfer
- SEGP1 - a SEGP1 seismic shotpoint file.
- SHAPEFILE - an ESRI Shapefile.
- SURFERGRID - a Surfer grid format file.
- SWEDISHDEMGRID - a Swedish DEM grid format file.
- TERRASCAN - a TerraScan LIDAR format file.
- TIGER_LINE - a Tiger/Line format file.
- USGS_DEM - a native format USGS DEM file.
- VPF - a Vector Product Format file such as VMAP or DNC data
- VULCAN_3D - a Vulcan3D triangulation file
- ZMAP_PLUS - a Geographix Zmap Plus+ format file.

- PROMPT_IF_TYPE_UNKNOWN - set to NO if you don't want the user to be prompted to select a file type if the type cannot automatically be determined (useful when looping).
- HIDDEN - set to YES to cause this overlay to be hidden from view after it is loaded. The default is to show the overlay.
- SAMPLING_METHOD (elevation and raster only) - specifies the sampling method to use when resampling this layer. The following values are supported:
  - NEAREST_NEIGHBOR - use the nearest neighbor sampling method
  - BILINEAR - use bilinear interpolation
  - BICUBIC - use bicubic interpolation
  - BOX_3X3 - use a 3x3 box average
  - BOX_4X4 - use a 4x4 box average
  - BOX_5X5 - use a 5x5 box average
  - BOX_7X7 - use a 7x7 box average
  - BOX_9X9 - use a 9x9 box average
  - MAX_3X3 - (terrain layers only) use maximum value found in 3x3 box
  - MAX_4X4 - (terrain layers only) use maximum value found in 4x4 box
  - MAX_5X5 - (terrain layers only) use maximum value found in 5x5 box
  - MAX_7X7 - (terrain layers only) use maximum value found in 7x7 box
  - MAX_9X9 - (terrain layers only) use maximum value found in 9x9 box
- ANTI_ALIAS [DEPRECATED - use SAMPLING_METHOD instead] (elevation and raster only) - specifies whether to remove jagged edges by making a subtle transition between pixels. Turning off this option helps maintain the hard edges of the pixels as they are rasterized. Use ANTI_ALIAS=YES to turn on. Anything else turns it off.
- CONTRAST_MODE (raster only) - specifies the type of contrast adjustment to apply to the data.
  - NONE - no contrast adjustment applied (this is the default)
  - PERCENTAGE - apply a percentage contrast adjustment. The CONTRAST_STRETCH_SIZE parameter can be used to override the number of standard deviations from the mean to stretch to.
  - MIN_MAX - apply a min/max contrast stretch, stretching the available range of values in each color band to the full range of 0-255. For imagery which contains both black and white, this will have no affect.

- CONTRAST_SHARED (raster only) - specified whether or not the contrast adjustment for this layer will share the adjustment with other contrast-adjusted layers in order to ensure a consistent modification across layers. Use CONTRAST_SHARED=YES to enable contrast sharing.
- CONTRAST_STRETCH_SIZE (raster only) - specifies the number of standard deviations from the mean to use in a PERCENTAGE contrast adjustment. The default is 2.0.
- AUTO_CONTRAST (raster only) - *DEPRECATED, use CONTRAST_MODE instead* - specifies whether to automatically calculate and apply a 2 standard deviation contrast adjustment to the image. Use AUTO_CONTRAST=YES to turn on. Anything else turns it off.
- CLIP_COLLAR (raster only) - specifies whether to clip the collar off of the image. The following values are supported for cropping:
    - NONE - no collar cropping is performed.
    - AUTO - automatically remove a USGS DRG-style collar or a 3.75 DOQQ collar
    - LAT_LON - crop the collar to a a specified set of bounds specified in arc degrees in the native datum of the layer. The bounds should be specified using the CLIP_COLLAR_BOUNDS parameter.
    - NATIVE - crop the collar to a specified set of bounds specified in the native projection system and datum of the layer. The bounds should be specified using the CLIP_COLLAR_BOUNDS parameter.
    - PIXELS - crop a given number of pixels off of each side of the layer. The number of pixels to remove from each side should be specified using the CLIP_COLLAR_BOUNDS parameter.
    - SNAP_DEGREES - crop the collar by snapping each edge to a specified degree boundary specified in arc degrees in the native datum of the layer. The bounds should be specified using the CLIP_COLLAR_BOUNDS parameter. For example to crop the west and east edges to a half degree boundary and the north and south edges to a one degree boundary, use the following: CLIP_COLLAR_BOUNDS=0.5,0.25,0.5,0.25.
    - POLY - crop to a polygon provided with the CLIP_COLLAR_POLY parameter.
- CLIP_COLLAR_BOUNDS (raster only) - specifies the bounds of the collar to be clipped off when the CLIP_COLLAR parameter is enabled. The coordinates should be specified in arc degrees, native layer coordinates, or pixel counts as a comma-delimited list going west,south,east,north. For example, CLIP_COLLAR_BOUNDS=34.25,-109.0,34.375,-108.875.
- CLIP_COLLAR_POLY (raster only) - specifies the name of the previously defined shape (with the DEFINE_SHAPE command) to crop the layer to when the CLIP_COLLAR=POLY parameter is used. The coordinates in the shape must have been defined in the native projection system of the layer being loaded.
- ZOOM_DISPLAY - specifies when the map should be displayed and when it should be hidden based on the display zoom scale. This command will be formatted as a name from the list, below followed by 2 numeric paramters. For example, use ZOOM_DISPLAY="SCALE,25000,0" to have a map display only when zoomed in below 1:25000 scale.
    - ALWAYS - always display the map. The numeric parameters are ignored.
    - PERCENT - display the map when the map bounding box is a certain percentage of the screen size. For example, use ZOOM_DISPLAY="PERCENT,10,0" to display the map when its bounding box is at least 10% of the screen size.
    - SCALE - display the map when the current display is at or below a certain scale. For example, use ZOOM_DISPLAY="SCALE,25000,0" to display the map when the current draw scale is at or below 1:25000.
    - SCALE_RANGE - display the map when the current display is below a range of scale value. For example, use ZOOM_DISPLAY="SCALE_RANGE,25000,100000" to display the map when the current draw scale is between 1:25000 and 1:100000.
- COLOR_INTENSITY (elevation and raster only) - specifies the color intensity to use when adjusting the brightness of pixels in the overlay. Valid values range from 0 to 20, with 0 being completely black, 10 being no alteration, and 20 being completely white. For example, to make an image slightly

darker, you could use COLOR_INTENSITY=7. (NOTE: This parameter has been deprecated in favor of the COLOR_INTENSITY_FULL parameter).

- COLOR_INTENSITY_FULL (elevation and raster only) - specifies the color intensity to use when adjusting the brightness of pixels in the overlay. Valid values range from 0 to 512, with 0 being completely white, 256 being no alteration, and 512 being completely black. For example, to make an image slightly darker, you could use COLOR_INTENSITY=300. (NOTE: This parameter replaces the COLOR_INTENSITY parameter).
- TEXTURE_MAP (raster only) - specifies that this image should be draped over any elevation data loaded before it. Use TEXTURE_MAP=YES to turn on. Anything else turns it off.
- TRANSPARENT_COLOR (elevation and raster only) - specifies the color to make transparent when rendering this overlay. The color should be specified as RGB(<red>,<green>,<blue>). For example, to make white the transparent color, use TRANSPARENT_COLOR=RGB(255,255,255). If you do not wish any color to be transparent, do not use this parameter. Optionally, if the image that you are making transparent uses a palette for the colors, you can specify a palette index in the following format: INDEX(<0-based palette index>). For example, to make the second color in the palette transparent, use TRANSPARENT_COLOR=INDEX(1).
- TRANSPARENT_COLOR_DIST - for layers that have specified a color to make transparent, this parameter allows you to specify how far a color in the layer has to be from the specified TRANSPARENT_COLOR value to be treated as transparent as well. The default value of 0 means that the colors have to exactly match for the pixel to be treated as transparent. Larger values (up to 256) allow larger distances between the layer color and the transparent color. This is useful for lossy formats, like JPEG.
- COLOR_GRADE (raster only) - specifies the color grading values to use for this layer (as configured on the Color Grade options dialog tab). This should be a comma-delimited list with the saturation value (from 0-1) first, then the input and output range for the red, green, and blue color channels, as follows:
  COLOR_GRADE=saturation,red_in_start,red_in_end,red_out_start,red_out_end,...,blue_out_end
- PROJ_NAME - specifies the name of the projection to use for this file (this will override any projection information stored in the file). This name must have been defined with a prior DEFINE_PROJ command.
- PROJ_FILENAME - specifies the name of the projection (.prj) file to use for this file (this will override any projection information stored in the file).
- PROJ_EPSG_CODE - specifies the numeric EPSG projection code that defines the projection for this file (this will override any projection information stored in the file). For example, use PROJ_EPSG_CODE=26715 to define a UTM zone 15 projection with NAD27 as the datum and meters as the units.
- PROMPT_IF_PROJ_UNKNOWN - set to NO if you don't want the user to be prompted to select a projection if the projection of the file cannot be automatically determined.
- ELEV_UNITS - specify elevation units to use for this file if it contains gridded elevation data and also for vector feature elevations that don't have a unit embedded in the elevation value. Valid values are as follows:
  - ♦ FEET - export in US feet
  - ♦ DECIFEET - export in 10ths of US feet
  - ♦ METERS - export in meters
  - ♦ DECIMETERS - export in 10ths of meters
  - ♦ CENTIMETERS - export in centimeters
- ELEV_OFFSET (elevation only) - specifies the offset in meters to apply to each elevation value in the layer. This allows you to vertically shift a layer to match other layers.
- ELEV_SCALE (elevation only) - specifies the scale value to apply to each elevation value in the layer. This allows you to vertically scale a layer to match other layers. Default to 1.0 (no scaling).

- MIN_ELEV (elevation only) - specifies the minimum elevation (meters) to treat as valid when rendering this layer. Any elevations below this value will be treated as invalid and not be drawn or exported.
- MAX_ELEV (elevation only) - specifies the maximum elevation (meters) to treat as valid when rendering this layer. Any elevations above this value will be treated as invalid and not be drawn or exported.
- CLAMP_ELEVS (elevation only) - if a MIN_ELEV and/or MAX_ELEV value is specified, setting this to YES will make any valid elevation values outside of the specified range be clamped to the new range value rather than treated as invalid.
- VOID_ELEV (elevation only) - specifies the elevation (meters) to replace any void areas in the layer with. If not specified, the void areas will be transparent.
- SHADER_NAME (elevation only) - this sets the name of the shader to use when rendering the gridded elevation data for this layer. Use this to override use of the shared default shader just for this layer. This must be one of the names displayed in the shader drop down in Global Mapper, such as "Atlas Shader" or "Global Shader" or the name of a custom shader.
- TRANSLUCENCY (elevation and raster only) - specifies the level of translucency (i.e. how "see-through" the layer is). Value values range from 0 to 512, with 0 meaning the layer is completely transparent (i.e. invisible) and 512 meaning the layer is completely opaque (this is the default).
- IGNORE_ALPHA (raster only) - specifies that an embedded alpha channel in an image should be ignored. This is useful for images that have incorrect alpha channels. Use IGNORE_ALPHA=YES to enable.
- BLEND_MODE (elevation and raster only)- specify blend mode to use for combining this overlay and any previously loaded overlays
    - NO_BLEND - no blending is done, this is the default
    - MULTIPLE
    - SCREEN
    - OVERLAY
    - HARD_LIGHT
    - COLOR_BURN
    - COLOR_DODGE
    - DARKEN
    - LIGHTEN
    - DIFFERENCE
    - EXCLUSION
    - APPLY_COLOR
    - APPLY_COLOR_REVERSE
    - KEEP_RED
    - KEEP_GREEN
    - KEEP_BLUE
- FEATHER_BLEND_EDGES (raster only) - specifies that the layer should be feature-blended around one or more ledges. This is a numeric bitfield value. Add the following values to enable blending on that edge:
    - 1 - blend top edge
    - 2 - blend bottom edge
    - 4 - blend left edge
    - 8 - blend right edge

  For example, to blend all edges, use FEATHER_BLEND_EDGES=15. The FEATHER_BLEND_SIZE parameter is used to specify how many pixels to blend on each blended edge.
- FEATHER_BLEND_SIZE (raster only) - specifies the size in pixels to use for a blend boundary.

- FEATHER_BLEND_POLY_FILE (raster only) - specifies that the polygon boundary to feather blend this layer against should come from the specified file.
- BAND_SETUP (raster only) - specifies what bands of data from the raster file being loaded should be used to populate the red, green, and blue color channels when displaying the image. This is useful for multi-spectral imagery which may have more than 3 color bands. The default band setup will be to use the first three bands as follows: BAND_SETUP="0,1,2". Note that not all raster formats support specifying a non-default band setup.
- LABEL_FIELD - specifies the name of the attribute field to use as the label attribute for the features in the file. By default the attribute-based labeling will only be applied to those features that don't already have a label, but if the LABEL_FIELD_FORCE_OVERWRITE attribute is set to YES then all features will have their labels replaced.
- LABEL_FIELD_FORCE_OVERWRITE - specifies that the LABEL_FIELD attribute value should be applied to all feature labels, not just those that don't already have labels. Use LABEL_FIELD_FORCE_OVERWRITE=YES to enable.
- LABEL_PREFIX - specifies the prefix to prepend to attribute-based labels
- LABEL_SUFFIX - specifies the suffix to append to attribute-based labels
- ELEV_FIELD - specifies the name of the attribute field to use as the elevation value for the features in the file.
- AREA_TYPE - specifies the name of the Global Mapper type to use for area features imported from the file.
- LINE_TYPE - specifies the name of the Global Mapper type to use for line features imported from the file.
- POINT_TYPE - specifies the name of the Global Mapper type to use for point features imported from the file.
- LAYER_DESC - specifies a description to use for the layer when displaying it in the Overlay Control Center. This overrides the default description based on the filename or other information within the file.
- GCP - specifies a single ground control point for use in rectifying a file. The GCP record consists of 5 comma-delimited fields, the control point name, the pixel X and Y coordinates, and the corresponding ground X and Y coordinates. A separate GCP parameter and value should be used for each control point used in the rectification. As an alternative, the GCP_FILENAME parameter (see below) can be used instead.
- GCP_FILENAME - specifies the name of a control point file used to rectify the file being imported.
- GCP_PROJ_NAME - specifies the name of the projection that the ground control points are provided in. This name must have been defined with a prior DEFINE_PROJ command. Use this if you want to specify control points in a projection other than what you want to define as the native projection for the file. Note that you must also explicitly specify the name projection of the file using either the PROJ_NAME, PROJ_EPSG_CODE or PROJ_FILENAME parameters.
- GCP_PROJ_FILENAME - specifies the name of the projection (.prj) file that contains the projection definition for the projection that the ground control points are provided in. Use this if you want to specify control points in a projection other than what you want to define as the native projection for the file. Note that you must also explicitly specify the name projection of the file using either the PROJ_NAME, PROJ_EPSG_CODE or PROJ_FILENAME parameters.
- GCP_PROJ_EPSG_CODE - specifies the EPSG code of the projection that the ground control points are provided in. Use this if you want to specify control points in a projection other than what you want to define as the native projection for the file. Note that you must also explicitly specify the name projection of the file using either the PROJ_NAME, PROJ_EPSG_CODE or PROJ_FILENAME parameters.
- RECTIFY - specifies the rectification method to use for rectifying this file. Valid value are LINEAR, HELMERT, AFFINE, POLYNOMIAL, and TRIANGULATION. If you do not specify a rectification type but do provide at least two ground control points, best rectification method will automatically be

chosen based on the number of control points specified.
- ALLOW_SELECTION - set to NO to disable selection of features from this layer using either the Feature Info or Digitizer Tools.

IMPORT_ARCHIVE

The IMPORT_ARCHIVE command imports a data file from a .tar.gz archive for later use. The only time you should ever need to use the IMPORT_ARCHIVE command is when you only want to load some of the data inside a .tar.gz archive. For the typical case of just loading everything in an archive, use the IMPORT command with AUTO as the value for the TYPE parameter. The following parameters are supported by the command.

- ARCHIVE_FILENAME - full path to the archive file to load the data from
- FILENAME - filename to load from the archive
- NOTE: All other parameters that are supported by the IMPORT command are also supported by this command.

IMPORT_ASCII

The IMPORT_ASCII command imports data from a generic ASCII text file for later use. The following parameters are supported by the command.

- FILENAME - full path to file to load the data from
- TYPE - type of import that we're doing
  - ♦ POINT_ONLY - all lines with coordinate data will result in a new point object begin created
  - ♦ POINT_AND_LINE - both point and line features will be created from coordinate data in the file. Line features will be created when coordinate data lines are back to back in the file. All individual coordinate lines will result in a point object being created
  - ♦ ELEVATION - all lines in the file with 3 coordinate values (x,y, and elevation) will be used to create an elevation grid. The data will be triangulated and gridded automatically, resulting in a fully usable elevation grid that can be exported to any of the supported elevation data formats.
- COORD_DELIM - specifies the delimeter between coordinates in coordinate lines
  - ♦ AUTO - automatically detect the delimeter type (default)
  - ♦ WHITESPACE - coordinates are separated with one or more space and/or tab characters
  - ♦ COMMA - coordinates are separated by commas
  - ♦ SEMICOLON - coordinates are separated by semicolons
  - ♦ TAB - coordinates are separated by tabs
- COORD_ORDER specifies the order of the coordinates in coordinate lines
  - ♦ X_FIRST - x coordinates (i.e. easting or longitude) come first, followed by y coordinates (i.e. northing or latitude) (default)
  - ♦ Y_FIRST - y coordinates (i.e. northing or latitude) come first, followed by x coordinates (i.e. easting or longitude)
- COORD_PREFIX - if present, this line is used to specify what special character sequence coordinate lines start with. For example, if the coordinate lines in the file started with the character sequence "XY,", you should use COORD_PREF="XY,". By default no coordinate prefix is assumed.
- INC_COORD_LINE_ATTRS - set the value of this parameter to YES if you wish to use any leftover text at the end of coordinate lines as attributes for the feature the coordinates are in. This could be

useful if elevation data is present at the end of the lines. By default, the value of this attribute is NO.

- INC_ELEV_COORDS - this parameter controls whether or not the value right after the 2nd coordinate column (if there is one) will be treated as an elevation value. Use INC_ELEV_COORDS=YES or INC_ELEV_COORDS=NO to enable (the default) or disable this behavior.
- COL_HEADERS - controls whether or not the first line of the file should be used as column headers for coordinate line attributes later in the file. Setting this to yes is useful for things like CSV files with column headers in the first row, otherwise set it to NO (the default).
- PROJ_NAME - specifies the name of the projection to use for this file (this will override any projection information stored in the file). This name must have been defined with a prior DEFINE_PROJ command.
- PROJ_FILENAME - specifies the name of the projection (.prj) file to use for this file (this will override any projection information stored in the file).
- PROJ_EPSG_CODE - specifies the numeric EPSG projection code that defines the projection for this file (this will override any projection information stored in the file). For example, use PROJ_EPSG_CODE=26715 to define a UTM zone 15 projection with NAD27 as the datum and meters as the units.
- PROMPT_IF_PROJ_UNKNOWN - set to NO if you don't want the user to be prompted to select a projection if the projection of the file cannot be automatically determined.
- ELEV_UNITS - specify elevation units to use for this file if it contains gridded elevation data
    - ♦ FEET - export in US feet
    - ♦ DECIFEET - export in 10ths of US feet
    - ♦ METERS - export in meters
    - ♦ DECIMETERS - export in 10ths of meters
    - ♦ CENTIMETERS - export in centimeters
- SKIP_COLUMNS - specifies the number of columns (fields) to skip at the start of a coordinate line before trying to read the coordinates. For example, if the X and Y coordinates of a line were in the 3rd and 4th columns of the coordinate line, you'd use a value of SKIP_COLUMNS=2. The default value is 0, meaning that coordinates must be in the first two columns.
- SKIP_ROWS - specifies the number of rows to skip at the start of a file before trying to read any data. For example, if your file has a fixed header of 20 lines, you would use SKIP_ROWS=20 to skip those header rows.
- BREAK_COL_IDX - specifies the 1-based index of the column to break features at if the value in that column changes.
- COORD_OFFSET - specifies the offset to apply to any coordinates read in from the file. This offset will be added to each coordinate read in from the file. The offset should be specified as a comma-delimited list of the X, Y, and Z offsets, such as COORD_OFFSET=100000.0,200000.0,0.0
- COORD_SCALE - specifies the scale factor to apply to any coordinates read in from the file. Each coordinate will be multiplied by these scale factor after being read in from the file. The scale factors should be specified as a comma-delimited list of the X, Y, and Z scale factors, such as COORD_SCALE=0.1,0.1,1.0
- NO_DATA_DIST_MULT - specifies how far from an actual data point a grid cell has to be before it is treated as a no data value. This number is given as a multiple of the diagonal size of a single grid cell as nominally determined by the gridding algorithm or specified with the SPATIAL_RES parameter. A value of 0 means that all points should be considered as valid.
- SPATIAL_RES - specifies spatial resolution to use when generating an elevation grid from the data. Defaults to a good value for maintaining the full spatial resolution of the provided point data if not specified. Should be formatted as x_resolution,y_resolution. The units are the units of the projection specified for the file. For example, if UTM with meter units was the file projection and you wanted to export at 30 meter spacing, the parameter/value pair would look like SPATIAL_RES=30.0,30.0.

- SPATIAL_RES_METERS - specifies spatial resolution to use in meters. The value in meters will automatically be converted to the curent view/export projection units. For example, to do an export at 2.0 meter spacing (or as close as you can get to that in the current units), use SPATIAL_RES_METERS=2.0, or to do an export at 1.0 meters in X by 1.5 meters in Y, use SPATIAL_RES_METERS="1.0,1.5".
- LABEL_FIELD - specifies the name of the attribute field to use as the label attribute for the features in the file.
- AREA_TYPE - specifies the name of the Global Mapper type to use for area features imported from the file.
- LINE_TYPE - specifies the name of the Global Mapper type to use for line features imported from the file.
- POINT_TYPE - specifies the name of the Global Mapper type to use for point features imported from the file.
- HIDDEN - set to YES to cause this overlay to be hidden from view after it is loaded. The default is to show the overlay.

SAMPLE:

```
IMPORT_ASCII FILENAME="C:\data\ASCII Files\usvi_landmark.asc" TYPE=POINT_AND_LINE COORD_DELIM=A
```

IMPORT_DIR_TREE

The IMPORT_DIR_TREE command imports all of the data files in a given directory tree that match a list of filename masks. The following parameters are supported by the command. **In addition, all of the option parameters for the IMPORT command are also supported for this command.**

- DIRECTORY - full path to root of directory tree to import files from.
- FILENAME_MASKS - space-separated list of filename masks to import. If no value is provided then all files which are of recognized types will be imported.

SAMPLE:

```
IMPORT_DIR_TREE DIRECTORY="C:\TEMP\EXPORT TEST" FILENAME_MASKS="*.OPT *.GMP"
```

IMPORT_TERRASERVER

The IMPORT_TERRASERVER command imports a chunk of TerraServer data, such as satellite imagery or topographic maps. The following parameters are supported by the command:

- THEME_NAME - name of the TerraServer theme to import, such as DOQ or DRG
- LAT_LON_BOUNDS - specifies the bounds to import in latitude/longitude degrees. There should be 4 values in a comma-delimited list following the parameter name. The values should be in order of westmost longitude, southernmost latitude, easternmost longitude, northernmost latitude.
- LAYER_BOUNDS - specifies that the import should use the bounds of the loaded layer(s) with the given filename. For example, to import to the bounds of the file "c:\test.tif", you would use LAYER_BOUNDS="c:\test.tif". Keep in mind that the file must be currently loaded.
- LAYER_BOUNDS_EXPAND - specifies that the operation should expand the used LAYER_BOUNDS bounding box by some amount. The amount to expand the bounding rectangle by

should be specified in the current global projection. For example, if you have a UTM/meters projection active and want to expand the bounds retrieved from the LAYER_BOUNDS parameter by 100 meters on the left and right, and 50 meters on the top and bottom, you could use LAYER_BOUNDS_EXPAND="100.0,50.0". You can also specify a single value to apply to all 4 sides, or supply 4 separate values in the order left,top,right,bottom.

- ANTI_ALIAS - specifies whether to remove jagged edges by making a subtle transition between pixels. Turning off this option helps maintain the hard edges of the pixels as they are rasterized. Use ANTI_ALIAS=YES to turn on. Anything else turns it off.
- CONTRAST_MODE (raster only) - specifies the type of contrast adjustment to apply to the data.
    - NONE - no contrast adjustment applied (this is the default)
    - PERCENTAGE - apply a percentage contrast adjustment. The CONTRAST_STRETCH_SIZE parameter can be used to override the number of standard deviations from the mean to stretch to.
    - MIN_MAX - apply a min/max contrast stretch, stretching the available range of values in each color band to the full range of 0-255. For imagery which contains both black and white, this will have no affect.
- CONTRAST_SHARED (raster only) - specified whether or not the contrast adjustment for this layer will share the adjustment with other contrast-adjusted layers in order to ensure a consistent modification across layers. Use CONTRAST_SHARED=YES to enable contrast sharing.
- CONTRAST_STRETCH_SIZE (raster only) - specifies the number of standard deviations from the mean to use in a PERCENTAGE contrast adjustment. The default is 2.0.
- AUTO_CONTRAST (raster only) - *DEPRECATED, use CONTRAST_MODE instead* - specifies whether to automatically calculate and apply a 2 standard deviation contrast adjustment to the image. Use AUTO_CONTRAST=YES to turn on. Anything else turns it off.
- COLOR_INTENSITY (elevation and raster only) - specifies the color intensity to use when adjusting the brightness of pixels in the overlay. Valid values range from 0 to 20, with 0 being completely black, 10 being no alteration, and 20 being completely white. For example, to make an image slightly darker, you could use COLOR_INTENSITY=7. (NOTE: This parameter has been deprecated in favor of the COLOR_INTENSITY_FULL parameter).
- COLOR_INTENSITY_FULL (elevation and raster only) - specifies the color intensity to use when adjusting the brightness of pixels in the overlay. Valid values range from 0 to 512, with 0 being completely white, 256 being no alteration, and 512 being completely black. For example, to make an image slightly darker, you could use COLOR_INTENSITY=300. (NOTE: This parameter replaces the COLOR_INTENSITY parameter).
- TEXTURE_MAP - specifies that this image should be draped over any elevation data loaded before it. Use TEXTURE_MAP=YES to turn on. Anything else turns it off.
- TRANSPARENT_COLOR - specifies the color to make transparent when rendering this overlay. The color should be specified as RGB(<red>,<green>,<blue>). For example, to make white the transparent color, use TRANSPARENT_COLOR=RGB(255,255,255). If you do not wish any color to be transparent, do not use this parameter.
- TRANSLUCENCY - specifies the level of translucency (i.e. how "see-through" the layer is). Value values range from 0 to 512, with 0 meaning the layer is completely transparent (i.e. invisible) and 512 meaning the layer is completely opaque (this is the default).
- BLEND_MODE - specifies the blend mode to use for combining this overlay and any previously loaded overlays
    - NO_BLEND - no blending is done, this is the default
    - MULTIPLE
    - SCREEN
    - OVERLAY
    - HARD_LIGHT
    - COLOR_BURN

- COLOR_DODGE
- DARKEN
- LIGHTEN
- DIFFERENCE
- EXCLUSION
- APPLY_COLOR
- APPLY_COLOR_REVERSE
- KEEP_RED
- KEEP_GREEN
- KEEP_BLUE

LOAD_PROJECTION

The LOAD_PROJECTION command imports a projection from a PRJ file and makes it the current global projection. This projection will be used for all exports after this command until another LOAD_PROJECTION command is encountered to change the global projection. The following parameters are supported by the command:

- FILENAME - full path to PRJ file to load the projection from
- PROJ_NAME - specifies the name of the projection to use. This name must have been defined with a prior DEFINE_PROJ command.
- PROJ_EPSG_CODE - specifies the numeric EPSG projection code that defines the projection. For example, use PROJ_EPSG_CODE=26715 to define a UTM zone 15 projection with NAD27 as the datum and meters as the units.

LOAD_STYLE_FILE

The LOAD_STYLE_FILE command load a Global Mapper Style (.gm_style) file containing style definitions for a list of types. You can optionally choose to have any types specified in the style file that aren't present in the running instance of Global Mapper to be added, providing a script way to add new custom types. The following parameters are supported by the command:

- FILENAME - full path to style (.gm_style) file to load
- ADD_UNKNOWN_TYPES - specifies that any types found in the style file that aren't present will be added as custom types. Use ADD_UNKNOWN_TYPES=NO to disable adding missing types, or ADD_UNKNOWN_TYPES=YES to enable it (this is the default).

LOAD_TYPE_FILTER

The LOAD_TYPE_FILTER command load a type filter from a Global Mapper Filter (GMF) file. You can create new GMF files from the type filter dialogs accessible from the Vector Display tab of the Configuration dialog. The following parameters are supported by the command:

- FILENAME - full path to GMF file to load
- FILTER_TYPE - specifies the type of features the filter file is for. The supported values area FILTER_TYPE=AREA, FILTER_TYPE=LINE, or FILTER_TYPE=POINT.

PLAY_SOUND

The PLAY_SOUND command plays either the information sound for the system or a specified sound file. This can be useful if you want audible confirmation when a script completes. The following parameters are supported by the command.

- FILENAME - full path to sound file (like .wav) to play. If not specified the information beep will play.

RESTORE_LAST_SAVED_VIEW

The RESTORE_LAST_SAVED_VIEW command restores the last view saved with the SAVE_CURRENT_VIEW command (or the last view saved with the View->Save Current View menu command in the Global Mapper user interface). This command does not take any parameters.

RUN_COMMAND

The RUN_COMMAND command allows you to execute any program on Windows with a set of parameters. The following parameters are supported by the command.

- COMMAND_LINE - full command line to run. If you need to use quotation marks in your command line, instead use apostrophes (i.e. ' rather than ") and they will be converted to quotes prior to running the command.
- WAIT_FOR_COMPLETE - specifies whether or not the script should wait for your command line run to complete prior to continuing. The default is to wait for the command to complete (i.e. WAIT_FOR_COMPLETE=YES). If you just want the command line to run and then immediately let the script continue processing, use WAIT_FOR_COMPLETE=NO.

Here is a sample that runs another instance of Global Mapper and loads a file:

```
RUN_COMMAND COMMAND_LINE="'c:\program files (x86)\GlobalMapper12\global_mapper12.exe' 'c:\temp\
```

SAVE_CURRENT_VIEW

The SAVE_CURRENT_VIEW command saves the current view window for later restoration using the RESTORE_LAST_SAVED_VIEW command. This command does not take any parameters.

SAVE_PROJECTION

The SAVE_PROJECTION command saves the current global projection to a PRJ file. The following parameters are supported by the command.

- FILENAME - full path to PRJ file to save the projection to

SET_BG_COLOR

The SET_BG_COLOR command sets the color to use for any background pixels when rendering layers. The following parameters are supported by the command.

- COLOR - specifies the background color to use. The color should be specified as RGB(<red>,<green>,<blue>). For example, to make white the background color, use COLOR=RGB(255,255,255).

SET_LOG_FILE

The SET_LOG_FILE command sets the name of the file to log status, warning, and error messages to. If the log file specified already exists, the messages will be appended to the end of it. The following parameters are supported by the command.

- FILENAME - full path to log file to write messages to

SET_VERT_DISP_OPTS

The SET_VERT_DISP_OPTS command allows you to modify the options used when rendering elevation layers, such as the shader to use, if any, as well as the lighting and water setup. The following parameters are supported by this command:

- ENABLE_HILL_SHADING - this setting controls whether or not hill shading (i.e. lighting, shadowing) will be done. Use YES to enable hill shading, and NO to disable hill shading.
- SHADER_NAME - this sets the name of the shader to use when rendering elevation data. This must be one of the names displayed in the shader drop down in Global Mapper, such as "Atlas Shader" or "Global Shader" or the name of a custom shader.
- AMBIENT_LIGHT_LEVEL - this sets the ambient lighting level. The valid range of values is [0.0, 1.0], with smaller numbers meaning completely black (i.e. no light) and 1.0 being full lighting.
- VERT_EXAG - this sets the vertical exaggeration to use when rendering elevation overlays. This effects the hill shading. The valid range of values is (0.0, 100.0].
- LIGHT_ALTITUDE - this sets the altitude angle of the light source that creates shadows on elevation data. The valid range of values is [0.0, 90.0], with 0.0 meaning a light source at the horizon and 90.0 meaning a light source directly overhead.
- LIGHT_AZIMUTH - this sets the direction angle of the light source that creates shadows on elevation data. The valid range of values is [0.0, 360.0), with 0.0 meaning a light source from the top of the screen (i.e. north), 90.0 meaning from the right (i.e. east), etc.
- SHADE_DARKNESS - this sets the minimum black level that a shadow can create. The valid range of values is [0,255], with 0 allowing complete blackness from a shadow, and 255 allowing no shadow at all.
- SHADE_HIGHLIGHT - this sets the level of white highlight applied to terrain areas directly facing the sun/light angle. The valid range of values is [0,255], with 0 applying no highlight and 255 making the direct areas always brightened completely to white.
- ENABLE_WATER - this setting controls whether or not water will be displayed on top of elevation values at or below the currently configured water level. Use YES to enable water display, and NO to

disable water display.
- WATER_COLOR - this setting controls the color that water drawn on top of elevation data is rendered in. The format of this value is RGB(<red>,<green>,<blue>). For example, to use a water color of blue, use WATER_COLOR=RGB(0,0,255).
- WATER_LEVEL - this setting specifies the height (in meters) below which water should be displayed if enabled.
- WATER_ALPHA - this setting controls how "see through" the water is when displayed. The valid range of values is [0,255], with 0 meaning the water is completely "see through", i.e. invisible, and 255 meaning that the water color is completely opaque such that you can't see any of the shaded relief below it.

SHOW_3D_VIEW

The SHOW_3D_VIEW command displays the 3D view window with the loaded data.

The following parameters are supported by the command:

- MAXIMIZE - specifies whether or not the 3D view window should be maximized or not. Use MAXIMIZE=YES to force the window to be maximized when displayed.

UNLOAD_ALL

The UNLOAD_ALL command unloads all currently loaded data. This command takes no parameters.

The following parameters are supported by the command:

- VECTOR_ONLY - specifies that only layers containing vector data shall be unloaded. All raster and gridded elevation layers will remain loaded. Use VECTOR_ONLY=YES to enable unloading just the vector layers.

UNLOAD_LAYER

The UNLOAD_LAYER command allows you to unload all previous loaded layers with a given filename. This is useful if you don't want to unload all previously loaded layers just to get rid of a few of them.

The following parameters are supported by the command:

- FILENAME - filename of the layer to unload. If an empty value is passed in, all layers that were created by the script, such as those from a GENERATE_CONTOURS command, will be unloaded. You can also pass in the value 'USER CREATED FEATURES' when running a script in the context of the main map view or loading a workspace to have the 'User Created Features' layer unloaded. You can also pass in the full description of the loaded layer to use in case you want to unload a layer not loaded from a file.

Crop, Merge, and Reproject 4 USGS DRGs into new GeoTIFF and JPEG files

```
GLOBAL_MAPPER_SCRIPT VERSION=1.00
UNLOAD_ALL

// Import the four 24K DRGs that we want to merge. We use the CLIP_COLLAR option
// to indicate that we want the collar to be automatically removed from the
// DRGs when they are imported.
IMPORT FILENAME="C:\DATA\DRG\KANSAS CITY\O39094B2.TIF"                      \
    TYPE=AUTO ANTI_ALIAS=NO AUTO_CONTRAST=NO CLIP_COLLAR=AUTO TEXTURE_MAP=NO
IMPORT FILENAME="C:\DATA\DRG\KANSAS CITY\O39094A1.TIF"                      \
    TYPE=AUTO ANTI_ALIAS=NO AUTO_CONTRAST=NO CLIP_COLLAR=AUTO TEXTURE_MAP=NO
IMPORT FILENAME="C:\DATA\DRG\KANSAS CITY\O39094A2.TIF"                      \
    TYPE=AUTO ANTI_ALIAS=NO AUTO_CONTRAST=NO CLIP_COLLAR=AUTO TEXTURE_MAP=NO
IMPORT FILENAME="C:\DATA\DRG\KANSAS CITY\O39094B1.TIF"                      \
    TYPE=AUTO ANTI_ALIAS=NO AUTO_CONTRAST=NO CLIP_COLLAR=AUTO TEXTURE_MAP=NO

// Load a projection file to set the global projection to geographic (lat/lon)
// arc degrees with a datum of NAD83.
LOAD_PROJECTION FILENAME="C:\DATA\PRJ Files\geo_degrees_nad83.prj"

// Use the EXPORT_RASTER command to generate a new 8-bit per pixel GeoTIFF file
EXPORT_RASTER FILENAME="C:\DATA\EXPORTED DATA\merged_drg_8bpp.tif"          \
    TYPE=GEOTIFF PALETTE=OPTIMIZED

// Now, use the EXPORT_RASTER command to generate a grayscale GeoTIFF file. Lets
// also create a world file for this one
EXPORT_RASTER FILENAME="C:\DATA\EXPORTED DATA\merged_drg_gray.tif"          \
    TYPE=GEOTIFF PALETTE=GRAYSCALE GEN_WORLD_FILE=YES

// Create a JPEG file using the EXPORT_RASTER command. Also create a world file
// and a projection file to make it easier to load in other places.
EXPORT_RASTER FILENAME="C:\DATA\EXPORTED DATA\merged_drg.jpg"                          \
    TYPE=JPEG GEN_WORLD_FILE=YES GEN_PRJ_FILE=YES
```

Generate Contours from all USGS DEMs in a Folder and Export them to DXF and Shape files

```
GLOBAL_MAPPER_SCRIPT VERSION=1.00
UNLOAD_ALL

// Loop over all DEM files in a folder and convert them
DIR_LOOP_START DIRECTORY="C:\DATA\SDTS_DEM\24K\" FILENAME_MASKS="*.DEM.STDS.TAR.GZ" RECURSE_DIR

        // Import an archived SDTS DEM file. Global Mapper will automatically
        // determine that this is an archived SDTS DEM file and load it
        // correctly.
        IMPORT FILENAME="%FNAME_W_DIR%" ANTI_ALIAS=YES

        // Generate 50 ft contours from the loaded DEM data.
        GENERATE_CONTOURS INTERVAL=50 ELEV_UNITS=FEET

        // Export the contours to a new DXF file. The created file will have
        // 3D polyline features for the contours.
        EXPORT_VECTOR FILENAME="%DIR%%FNAME_WO_EXT%_CONTOURS.DXF" TYPE=DXF GEN_PRJ_FILE=YES

        // Export the contours to a 3D shape file.
        EXPORT_VECTOR FILENAME="%DIR%%FNAME_WO_EXT%_CONTOURS.SHP" TYPE=SHAPEFILE  \
                SHAPE_TYPE=LINES GEN_3D_LINES=YES GEN_PRJ_FILE=YES

        // Unload the loaded data
        UNLOAD_ALL
```

```
// End the loop
DIR_LOOP_END
```

Edit Vector Features Based on an Attribute and Display Label

```
GLOBAL_MAPPER_SCRIPT VERSION=1.00

// Import the file to modify
IMPORT FILENAME="C:\Temp\export test\tiger_wyandotte_sample.gmp"

// Assign the type "railroad" to all features with a CFCC attribute with a value of A41
// and a display label with '74' in it somewhere.
EDIT_VECTOR LINE_TYPE="RAILROAD" COMPARE_STR="CFCC=A41" COMPARE_STR="<Feature Name>=*74*"

// Assign the name "Burlington Northern Railroad" to all features with a CFCC attribute with a
EDIT_VECTOR ATTR_VAL="<Feature Name>=Burlington Northern Railroad" COMPARE_STR="CFCC=A41"
```

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Global Mapper Scripting Reference - Aerial View Of Address - Aerial House View

BUILT-IN AREA TYPES, FILL PATTERNS AND BORDER STYLES

This section reviews the area, line and point styles built into Global Mapper.

- Area Styles
  - Area Types
  - Area Fill Patterns
  - Area Border Styles

Area Styles

Using the Area Styles panel users can configure how areas of a given type will be displayed in Global Mapper. Area fill, border style and color can be modified on a type-by-type basis. The Show Labels for Areas of This Type option allows users to turn area labels off on a type-by-type basis.

Area Types are shown in the Global Mapper Area Types table. Tables showing the Global Mapper Fill Patterns and Border Styles follow the Area Types table.

Global Mapper recognizes five field attributes as containing information for the display appearence of an Area Type. They are:

```
GM_TYPE=
BORDER_COLOR=
BORDER_WIDTH=
BORDER_STYLE=
FILL_COLOR=
FILL_STYLE=
```

The "FILL_ALPHA=" field attribute is recognized by Global Mapper to set an Area Type's transparency. Values for "FILL_ALPHA=" range from 0 (Transparent) to 255 (Opaque). To determine the transparency value setting simply multiply the percentage by 255 and round off to the nearest integer (e.g. 75% transparency 0.75 x 255 = 191.25, use 191).

As an example, the default field attributes for the Anchorage Area Type are:

```
GM_TYPE=Anchorage Area
BORDER_COLOR=RGB(255,0,255)
BORDER_WIDTH=1
BORDER_STYLE=Comb (Right Only)
FILL_COLOR=RGB(255,0,255)
FILL_STYLE=No Fill
```

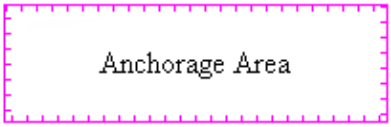
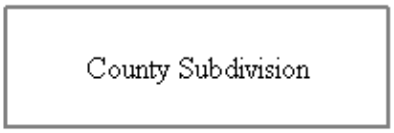
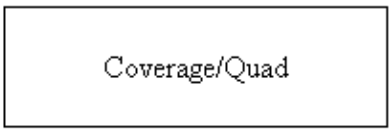
To change the type's transparency to 35% the FILL_ALPHA field attribute value should be set equal to 89 (0.35 x 255 = 89.25).

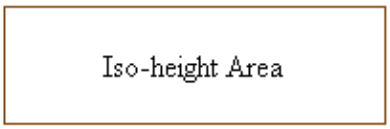
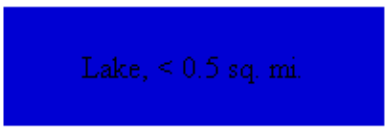
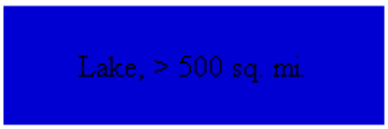
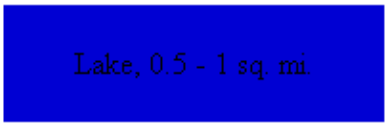
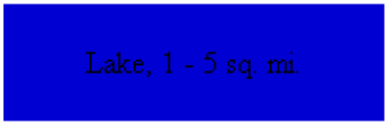
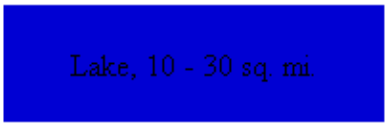
```
GM_TYPE=Anchorage Area
BORDER_COLOR=RGB(255,0,255)
BORDER_WIDTH=1
BORDER_STYLE=Comb (Right Only)
FILL_COLOR=RGB(255,0,255)
FILL_STYLE=No Fill
FILL_ALPHA=89
```

Area Types

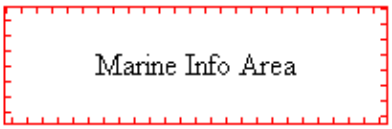
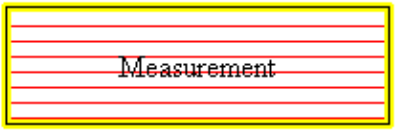
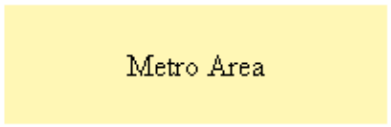
Global Mapper's View --> Background Color... color designation influences which areas can be seen. Any area whose color is the same as the Global Mapper Backgrond Color will not be seen. Example, for a white Background Color (RGB 255,255,255), the Snow or Glacier Area will not be visible.

Global Mapper Built-In Area Types

Area Type	Example	Fill Pattern	Fill Color	Border Width	Border Style	Border Color
Anchorage Area		No Fill	0,0,0	1	Comb (Right Only)	0,0,0
City Park		Solid Fill	0,235,0	1	Null	0,0,0
Country		No Fill	0,0,0	1	Solid	0,0,0
County		No Fill	0,0,0	2	Solid	0,0,0
County Subdivision		No Fill	0,0,0	2	Solid	128,128,128
Coverage/Quad		No Fill	0,0,0	1	Solid	0,0,0
Cropland		Solid Fill	183,183,0	1	Null	0,0,0
Dry Lakebed		Intermittent Water Pattern	132,130,255	1	Null	0,0,0
Intermittent Lake		Intermittent Water Pattern	132,130,255	1	Null	0,0,0

Intermittent Stream/River		Intermittent Water Pattern	132,130,255	1	Null	0,0,0
Intertidal Area		Solid Fill	192,240,188	1	Null	0,0,0
Island		No Fill	0,0,0	1	Solid	0,0,0
Isobath Area		Solid Fill	132,130,255	1	Null	0,0,0
Iso-height Area		No Fill	0,0,0	1	Solid	128,64,0
Lake, < 0.5 sq. mi.		Solid Fill	0,0,211	1	Null	0,0,0
Lake, > 500 sq. mi.		Solid Fill	0,0,211	1	Null	0,0,0
Lake, 0.5 - 1 sq. mi.		Solid Fill	0,0,211	1	Null	0,0,0
Lake, 1 - 5 sq. mi.		Solid Fill	0,0,211	1	Null	0,0,0
Lake, 10 - 30 sq. mi.		Solid Fill	0,0,211	1	Null	0,0,0

Lake, 100 - 250 sq. mi.	Lake, 100 - 250 sq. mi.	Solid Fill	0,0,211	1	Null	0,0,0
Lake, 250 - 500 sq. mi.	Lake, 250 - 500 sq. mi.	Solid Fill	0,0,211	1	Null	0,0,0
Lake, 30 - 100 sq. mi.	Lake, 30 - 100 sq. mi.	Solid Fill	0,0,211	1	Null	0,0,0
Lake, 5 - 10 sq. mi.	Lake, 5 - 10 sq. mi.	Solid Fill	0,0,211	1	Null	0,0,0
Lake, Unknown Area	Lake, Unknown Area	Solid Fill	0,0,211	1	Null	0,0,0
Land Area	Land Area	Solid Fill	220,212,148	1	Null	0,0,0
Land Grant	Land Grant	No Fill	0,0,0	2	Null	0,0,0
Large Metro Area	Large Metro Area	Solid Fill	255,247,181	1	Null	0,0,0
Major National Park	Major National Park	Solid Fill	0,235,0	1	Null	0,0,0
Major River	Major River	Solid Fill	0,0,211	1	Null	0,0,0

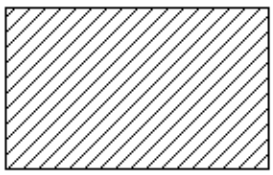
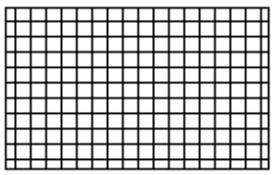
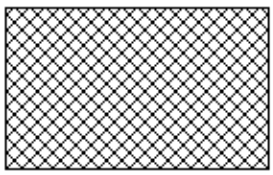
Major State Park		Solid Fill	0,235,0	1	Null	0,0,0
Map Catalog Layer Bounds		Diagonal Cros-Hatch	255,64,64	1	Solid	0,0,255
Marine Info Area		No Fill	255,0,255	1	Comb (Right Only)	255,0,0
Marine Traffic Area		Backwards Diagonal Cross-Hatch	255,0,255	1	Solid	0,0,0
Measurement		Horizontal Hatch	255,0,0	5	Striped	255,255,0
Metro Area		Solid Fill	255,247,181	1	Null	0,0,0
Minor River		Solid Fill	0,0,211	1	Null	0,0,0
Misc. Manmade Structure		Solid Fill	255,64,64	1	Null	0,0,0
National Park		Solid Fill	0,235,0	1	Null	0,0,0
Ocean		Solid Fill	0,0,211	1	Null	0,0,0

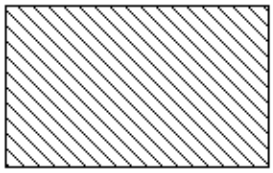
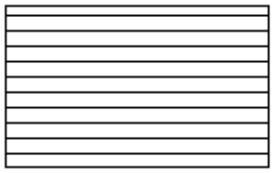
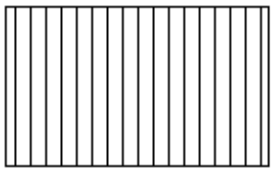
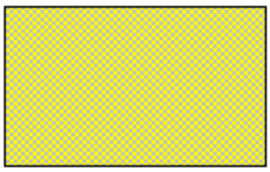
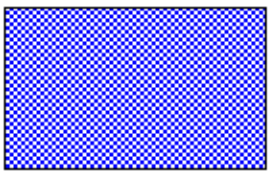
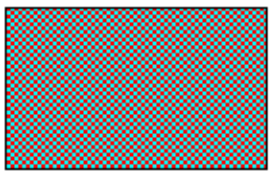
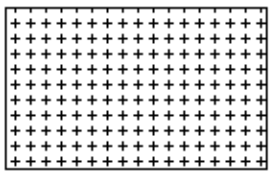
Orchard or Plantation	Orchard or Plantation	Solid Fill	255,128,0	1	Null	0,0,0
Range Ring	Range Ring	No Fill	0,0,0	3	Solid	0,0,0
Reef	Reef	Coral Pattern	255,0,0	1	Null	0,0,0
Regional River	Regional River	Solid Fill	0,0,211	1	Null	0,0,0
Reservation	Reservation	Solid Fill	255,0,0	1	Null	0,0,0
Rock	Rock	Solid Fill	104,133,138	1	Null	0,0,0
Salt	Salt	Salt Pattern	192,102,192	1	Null	0,0,0
Sand	Sand	Sand Pattern	255,255,0	1	Null	0,0,0
Scattered Trees	Scattterd Trees	Solid Fill	0,255,0	1	Null	0,0,0
Scrub Area	Scrub Area	Diagonal Cross-Hatch	0,128,128	1	Null	0,0,0

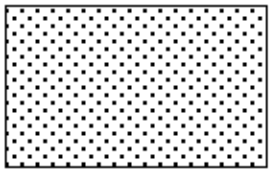
Small Metro Area	Small Metro Area	Solid Fill	255,247,181	1	Null	0,0,0
Snow or Glacier	Snow or Glacier	Solid Fill	255,255,255	1	Null	0,0,0
State	State	No Fill	0,0,0	3	Solid	0,0,0
State Park	State Park	Solid Fill	0,235,0	1	Null	0,0,0
Survey Section	Survey Section	No Fill	0,0,0	2	Solid	0,0,0
TIN Face Area	TIN Face Area	No Fill	0,0,0	1	Solid	0,0,0
Tundra	Tundra	Solid Fill	145,177,196	1	Null	0,0,0
Unclassified Area Feature	Unclassified Area Feature	No Fill	0,0,0	1	Solid	0,0,0
Unknown Area Type	Unknown Area Type	No Fill	0,0,0	1	Solid	0,0,0
View Shed Coverage Area	View Shed Coverage Area	No Fill	0,0,0	1	Solid	0,0,0

Wetland		Solid Fill	125,191,167	1	Null	0,0,0
Wooded Area		Backwards Diagonal Cross-Hatch	165,145,97	1	Null	0,0,0

Area Fill Patterns

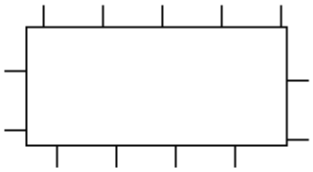
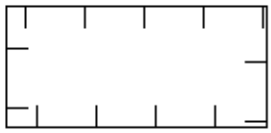
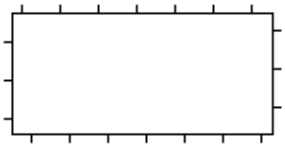
Global Mapper Fill Patterns	
Fill Pattern	**Example**
No Fill	
Solid Fill	
Backwards Diagonal Cross-Hatch	
Cross-Hatch	
Diagonal Cross-Hatch	

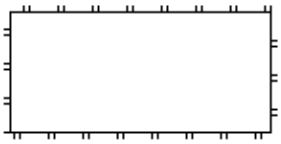
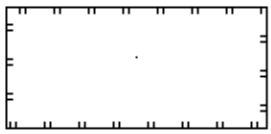
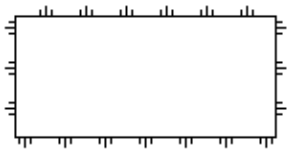
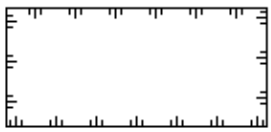
Forward Diagonal Cross-Hatch	
Horizontal Hatch	
Vertical Hatch	
Sand_Pattern	
Intermittent_Water_Pattern	
Salt_Pattern	
Coral_Pattern	
Black_Cross_Pattern	

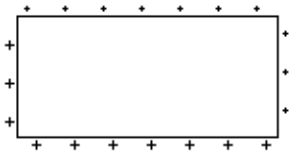
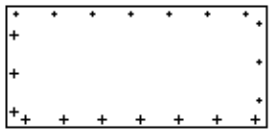
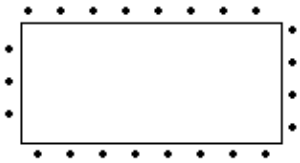
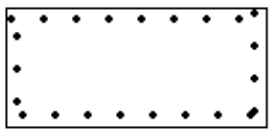
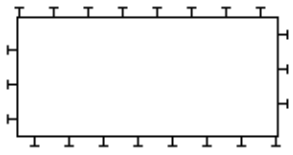
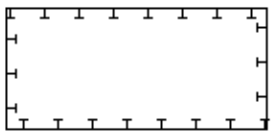
Black_Dot_Pattern	

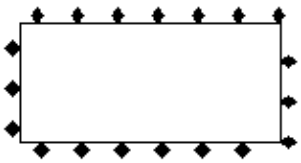
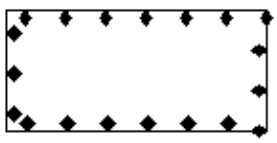
Area Border Styles

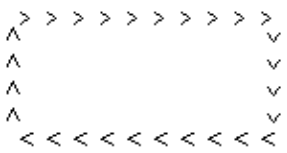
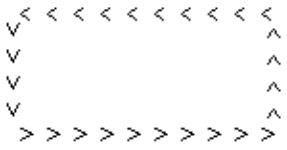
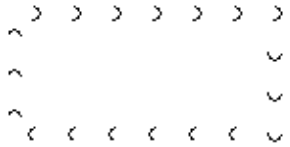
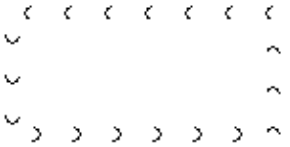
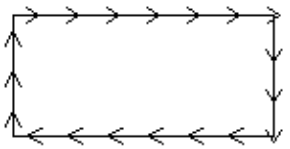
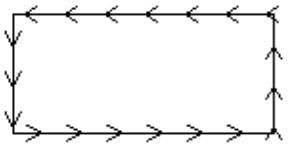
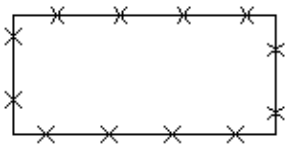
Global Mapper Border Styles	
Border Style	**Example**
Solid	
Dash	
Dot	
Dash - Dot	
Dash - Dot - Dot	
Null	

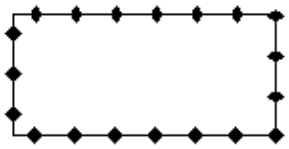
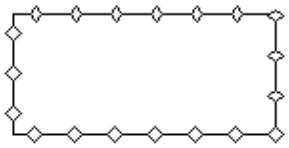
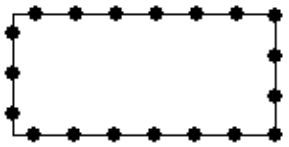
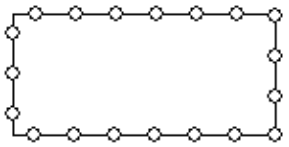
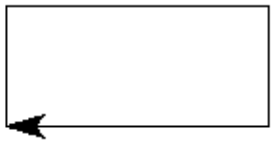
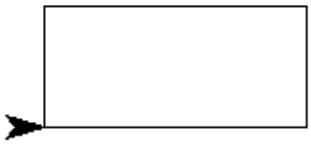
Railroad	
Striped	
Comb (Left Only)	
Comb (Right Only)	
Comb (Long Teeth, Left Only)	
Comb (Long_Teeth, Right Only)	
Comb (Widely Spaced, Left Only)	
Comb (Widely Spaced, Right Only)	
Comb (Long & Short Teeth, Left Only)	

Comb (Long & Short Teeth, Right Only)	
Comb (Double Teeth, Left Only)	
Comb (Double Teeth, Right Only)	
Comb (Triplet, Left Only)	
Comb (Triplet, Right Only)	
Rake (Narrow Spaced, Left Only)	
Rake (Narrow Spaced, Right Only)	
Rake (Widely Spaced, Left Only)	
Rake (Widely Spaced, Right Only)	

Solid with Minus Signs on Left	
Solid with Minus Signs on Right	
Solid with Plus Signs on Left	
Solid with Plus Signs on Right	
Solid with Dots on Left	
Solid with Dots on Right	
Solid with Ts on Left	
Solid with Ts on Right	
Solid with Rectangles on Left	

Solid with Rectangles on Right	
Solid with Squares on Left	
Solid with Squares on Right	
Half Circles (Tightly Spaced, Left Only)	
Half Circles (Tightly Spaced, Right Only)	
Half Circles (Widely Spaced, Left Only)	
Half Circles (Widely Spaced, Right Only)	
Solid with Diamonds on Left	
Solid with Diamonds on Right	

V Track (Opens Towards End of Null Line)	
V Track (Opens Towards Start of Null Line)	
C Track (Opens Towards End of Line)	
C Track (Opens Towards Start of Line)	
Arrow Track (Points Towards Start of Line)	
Arrow Track (Points Towards End of Line)	
V Track (Opens Towards End of Solid Line)	
V Track (Opens Towards Start of Solid Line)	
Solid with Xs Through Line	

Solid with Diamonds along Line	
Solid with Empty Diamonds along Line	
Solid with Circles along Line	
Solid with Empty Circles along Line	
Solid with Arrow Pointing to Start	
Solid with Arrow Pointing to End	
Solid with Empty Circle at Start	
Solid with Empty Circle at End	
Solid with Black Edges	

BUILT-IN LINE TYPES AND DRAWING STYLES

This section reviews the area, line and point styles built into Global Mapper.

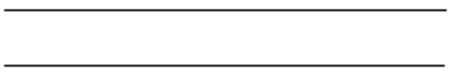
- Line Styles
  - Line Type Features
  - Drawing Styles

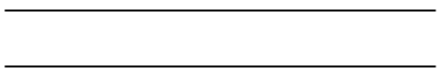
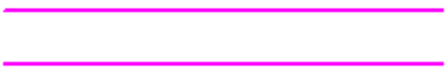
Line Styles

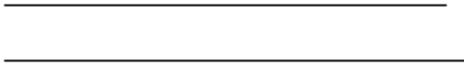
Upper line shows line types normal appearance. Lower line shows how line type appears when "Display Roads As Fat Lines When Zoomed In" option is checked and display is zoomed in.

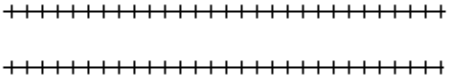
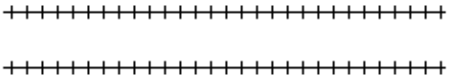
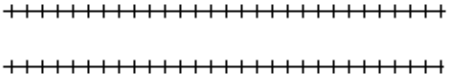
Global Mapper's View --> Background Color... color designation influences which lines can be seen. Any line whose color is the same as the Global Mapper Backgrond Color will not be seen. Example, for a white Background Color (RGB 255,255,255), the Processing/Closure Line will not be visible.

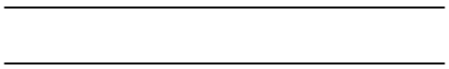
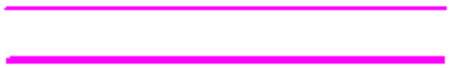
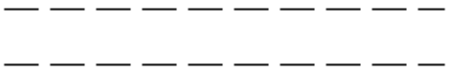
Global Mapper Built-In Line Types

Line Type	Example	Drawing Style	Line Width	Line Color
Airport Runway		Solid	1	0,0,0
Alley or Driveway		Solid	1	128,128,128
Arterial Road		Solid	2	0,128,0
Bathymetric Contour, Intermediate		Solid	2	132,130,255
Bathymetric Contour, Major		Solid	3	132,130,255
Bathymetric Contour, Minor		Solid	1	132,130,255
Bathymetric Contour, Supplementary		Solid	1	132,130,255

City Boundary		Solid	1	0,0,0
Collector Road		Solid	1	255,128,0
Contour Line, Intermediate		Solid	2	128,64,0
Contour Line, Major		Solid	3	128,64,0
Contour Line, Minor		Solid	1	128,64,0
Contour Line, Supplementary		Solid	1	128,64,0
County Route		Solid	2	255,0,255
Deleted Line		Dash	1	192,192,192
Digitizer Tool Line		Striped	5	255,255,0
Dry Stream or River		Dot	1	0,0,211
Ferry Route		Solid	1	255,128,0
Grid Line		Solid	1	128,128,128

Grid Line - Major		Solid	2	128,128,128
Grid Line - Minor		Solid	1	128,128,128
Intermittent Stream or River		Dash	1	0,0,211
International Political Boundary		Solid	6	0,0,0
Interstate		Solid	3	132,130,255
Invisible Boundary		Dot	1	192,192,192
Major Political Boundary (State)		Solid	5	128,128,128
Major/US Highway		Solid	2	255,64,64
Marine Route		Solid	1	0,0,0
Measurement		Striped	5	255,255,0
Minor Political Boundary (County)		Solid	4	0,0,0
Park Boundary		Solid	1	0,255,0

Pipeline		Dash	1	128,128,128
Powerline		Dash - Dot	1	128,128,128
Processing/Closure Line		Solid	2	255,255,255
Railroad		Railroad	1	0,0,0
Railroad, Class 1A		Railroad	1	0,0,0
Railroad, Class 1B		Railroad	1	0,0,0
Ramp		Solid	1	0,255,255
Residential Road		Solid	1	128,128,128
River, < 20 km		Solid	1	0,0,211
River, > 250 km		Solid	3	0,0,211
River, 100 - 250 km		Solid	3	0,0,211
River, 20 - 50 km		Solid	2	0,0,211

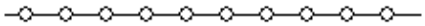
River, 50 - 100 km		Solid	2	0,0,211
River, Unknown Length		Solid	1	0,0,211
Selected Line		Dash	1	2550,0,0
Shoreline		Solid	1	0,0,0
State Highway		Solid	2	255,0,255
Stream		Solid	1	0,0,211
Tracklog		Dash	1	0,0,0
Trail		Solid	1	128,128,128
Unclassified Line Feature		Solid	1	128,128,128
Unknown Line Type		Solid	1	0,0,0
Unpaved Road		Solid	1	128,128,128

Drawing Styles

Global Mapper Drawing Styles	
Drawing Style	**Example**

Solid	
Dash	
Dot	
Dash - Dot	
Dash - Dot - Dot	
Null	
Railroad	
Striped	
Comb (Left Only)	
Comb (Right Only)	
Comb (Long Teeth, Left Only)	
Comb (Long Teeth, Right Only)	
Comb (Widely Spaced, Left Only)	
Comb (Widely Spaced, Right Only)	
Comb (Long & Short Teeth, Left Only)	
Comb (Long & Short Teeth, Right Only)	
Comb (Double Teeth, Left Only)	
Comb (Double Teeth, Right Only)	
Comb (Triplet, Left Only)	
Comb (Triplet, Right Only)	
Rake (Narrow Spaced, Left Only)	
Rake (Narrow Spaced, Right Only)	
Rake (Widely Spaced, Left Only)	
Rake (Widely Spaced, Right Only)	
Solid with Minus Signs on Left	
Solid with Minus Signs on Right	
Solid with Plus Signs on Left	

Solid with Plus Signs on Right	
Solid with Dots on Left	
Solid with Dots on Right	
Solid with Ts on Left	
Solid with Ts on Right	
Solid with Rectangles on Left	
Solid with Rectangles on Right	
Solid with Squares on Left	
Solid with Squares on Right	
Half Circles (Tightly Spaced, Left Only)	
Half Circles (Tightly Spaced, Right Only)	
Half Circles (Widely Spaced, Left Only)	
Half Circles (Widely Spaced, Right Only)	
Solid with Diamonds on Left	
Solid with Diamonds on Right	
V Track (Opens Towards End of Null Line)	
V Track (Opens Towards Start of Null Line)	
C Track (Opens Towards End of Line)	
C Track (Opens Towards Start of Line)	
Arrow Track (Points Towards Start of Line)	
Arrow Track (Points Towards End of Line)	
V Track (Opens Towards End of Solid Line)	
V Track (Opens Towards Start of Solid Line)	
Solid with Xs through Line	
Solid with Diamonds along Line	
Solid with Empty Diamonds along Line	
Solid with Circles along Line	

Solid with Empty Circles along Line	
Solid with Arrow Pointing to Start	
Solid with Arrow Pointing to End	
Solid with Empty Circle at Start	
Solid with Empty Circle at End	
Solid with Black Edges	

BUILT-IN POINT TYPES AND SYMBOLS

This section reviews the area, line and point styles built into Global Mapper.

- Point Styles
  - Point Type Features
  - Symbols - Basic
  - Symbols - Geology

Point Styles

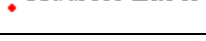
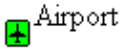
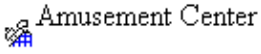
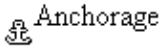
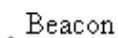
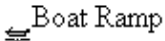
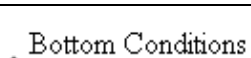
Using the Point Styles panel users can configure what symbol will be used to display points of a given type. In addition, the Show Labels for Points of This Type option allows a user to turn point labels off on a type-by-type basis. The Custom Symbols section allows users to create new symbols from their own bitmap and icon files which they can then use as the symbol to display for a given type.

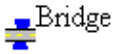
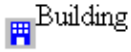
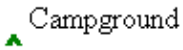
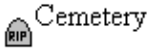
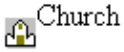
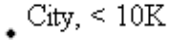
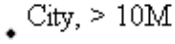
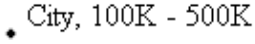
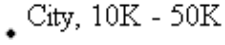
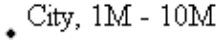
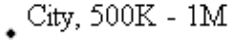
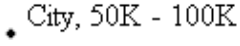
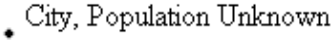
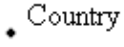
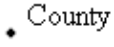
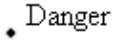
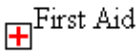
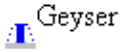
Global Mapper's Point Type Features are listed in the Global Mapper Point Type Features table. Symbols are listed in the Global Mapper Symbols table.

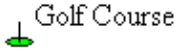
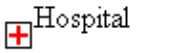
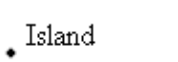
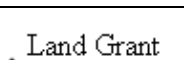
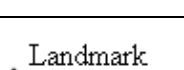
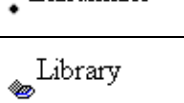
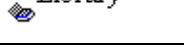
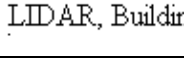
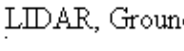
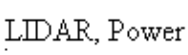
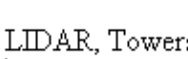
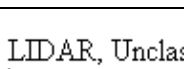
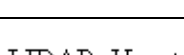
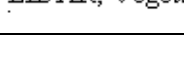
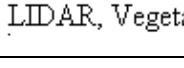
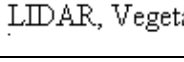
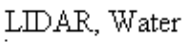
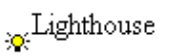
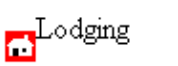
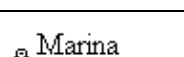
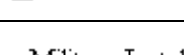
Global Mapper recognizes two field attributes as containing information for the display appearence of a Point Type. They are:

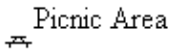
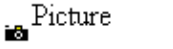
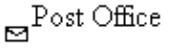
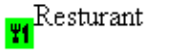
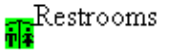
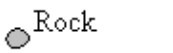
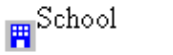
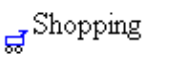
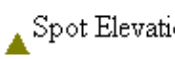
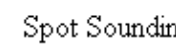
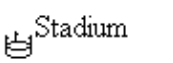
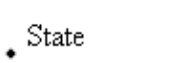
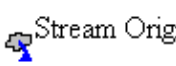
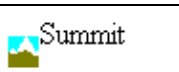
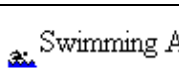
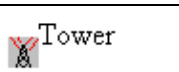
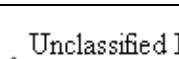
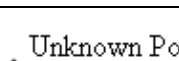
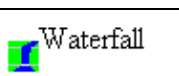
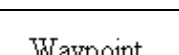
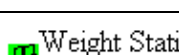
```
GM_TYPE=Address Label
POINT_SYMBOL=Dot - Red
```

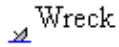
Point Type Features

Global Mapper Built-In Point Type Features		
Point Type	**Example**	**Symbol**
Address Label		Dot - Red
Airport		Airport
Amusement Center		Amusement Center
Anchorage		Marina
Arch		Arch
Bank		Bank
Beacon		Dot
Boat Ramp		Boat Ramp
Bottom Conditions		Dot

Bridge		Bridge
Building		School
Buoy		Dot
Campground		Campground
Cemetery		Cemetery
Church		Church
City, < 10K		Dot
City, > 10M		Dot
City, 100K - 500K		Dot
City, 10K - 50K		Dot
City, 1M - 10M		Dot
City, 500K - 1M		Dot
City, 50K - 100K		Dot
City, Population Unknown		Dot
Cliff		Cliff
Country		Dot
County		Dot
Dam		Dam
Danger		Dot
First Aid		Hospital
Geyser		Geyser

Golf Course		Golf
Hospital		Hospital
Island		Dot
Land Grant		Dot
Landmark		Dot
Library		Library
LIDAR, Building		Elevation Shaded
LIDAR, Ground Shot		Elevation Shaded
LIDAR, Power Lines		Elevation Shaded
LIDAR, Towers or Poles		Elevation Shaded
LIDAR, Unclassified		Elevation Shaded
LIDAR, Vegetation (High)		Elevation Shaded
LIDAR, Vegetation (Low)		Elevation Shaded
LIDAR, Vegetation (Medium)		Elevation Shaded
LIDAR, Water		Elevation Shaded
Lighthouse		Lighthouse
Lodging		Lodging
Marina		Marina
Military Installation		Dot
Mine		Mine
Park		Park

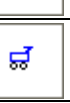
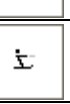
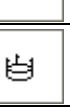
Picnic Area		Picnic Area
Picture		Scenic View
Post Office		Post Office
Resturant		Resturant
Restrooms		Restrooms
Rock		Rock
School		School
Shopping		Shopping
Spot Elevation		Spot Elevation
Spot Sounding		No Symbol
Stadium		Stadium
State		Dot
Stream Origin		Stream Origin
Summit		Summit
Swimming Area		Swimming Area
Tower		Tower
Unclassified Point Feature		Dot
Unknown Point Feature		Dot
Waterfall		Waterfall
Waypoint		Dot
Weigh Station		Weigh Station

Well		Well
Wreck		Wreck

Symbols

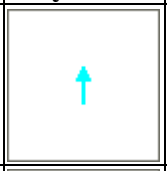
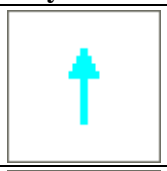
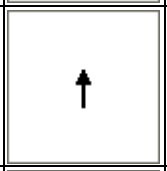
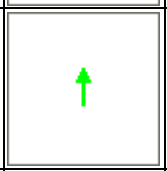
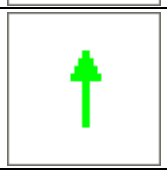
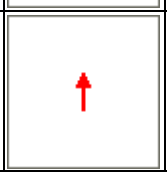
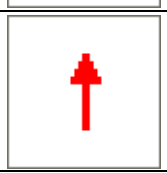
Global Mapper Built-In Symbols		
Name	**Symbol**	**2x Sym Details**
Airport		
Amusement Center		
Arch		
Auto Rental		
Bank		
Beacon		
Big Red X		
Big Yellow X		
Boat Ramp		
Bridge		
Bullseye		
Campground		
Cemetry		
Church		
Cliff		
Dam		
Danger Area		

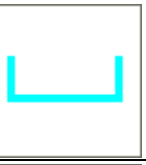
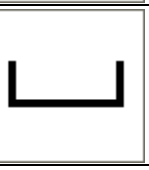
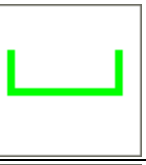
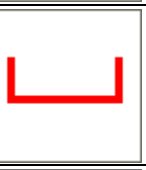
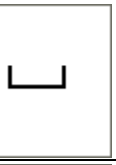
Deer		
Diag Crosshair - Red		
Diag Crosshair - Yellow		
Dot		
Dot - Blue		
Dot - Green		
Dot - Red		
Dot - White		
Dot - Yellow		
Elevation Shaded		
Fish		
Fuel		
Geyser		
Golf		
Hospital		
Library		
Lighthouse		
Little Blue X		
Lodging		
Marina		
Mine		

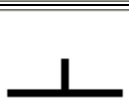
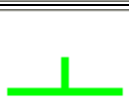
No Symbol		
Park		
Phone		
Picnic Area		
Post Office		
Resturant		
Restroom		
Rock		
Scenic View		
School		
Shopping		
Skiing		
Spot Elevation		
Stadium		
Stream Origin		
Summit		
Swimming Area		
Tower		
Waterfall		
Weigh Station		
Well		

Well - Active		
Well - Active at TD		
Well - Dryhole		
Well - Gas		
Well - Injection		
Well - Location		
Well - Oil		
Well - Oil and Gas		
Well - Suspended		
Wreck		

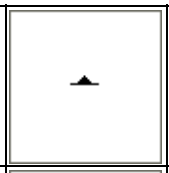
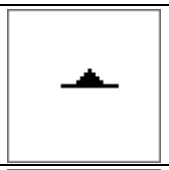
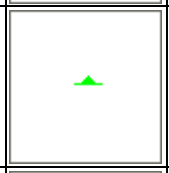
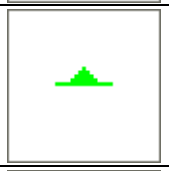
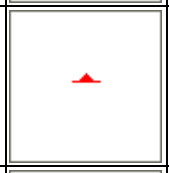
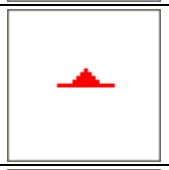
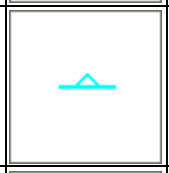
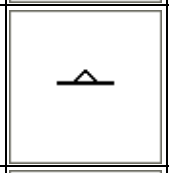
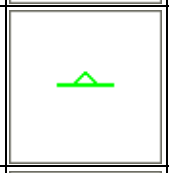
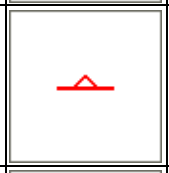
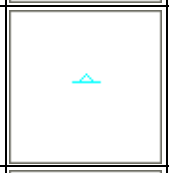
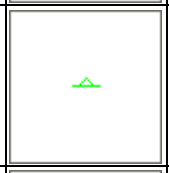
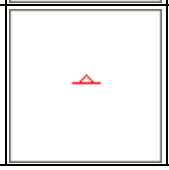
Symbols - Geology

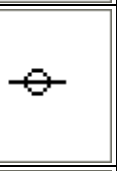
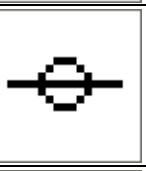
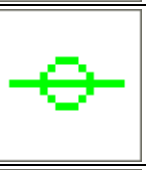
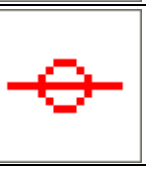
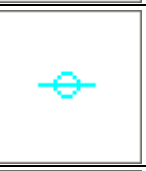
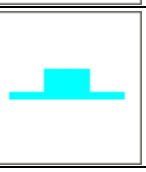
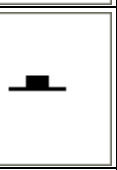
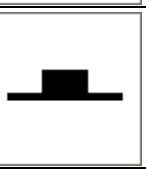
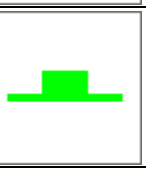
Global Mapper Built-In Symbols		
Name	**Symbol**	**2X Sym Details**
Geology - Arrow (Medium, Aqua)		
Geology - Arrow (Medium, Black)		
Geology - Arrow (Medium, Green)		
Geology - Arrow (Medium, Red)		

Geology - Arrow (Small, Aqua)		
Geology - Arrow (Small, Black)		
Geology - Arrow (Small, Green)		
Geology - Arrow (Small, Red)		
Geology - Cleavage (Medium, Aqua)		
Geology - Cleavage (Medium, Black)		
Geology - Cleavage (Medium, Green)		
Geology - Cleavage (Medium, Red)		
Geology - Cleavage (Small, Aqua)		
Geology - Cleavage (Small, Black)		
Geology - Cleavage (Small, Green)		

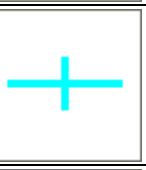
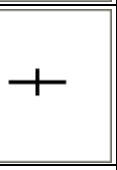
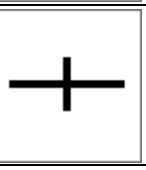
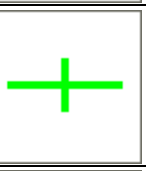
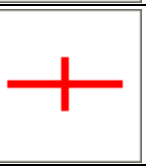
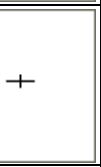
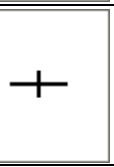
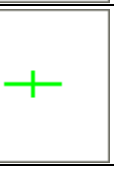
Geology - Cleavage (Small, Red)		
Geology - Dip, Bedding (Medium, Aqua)		
Geology - Dip, Bedding (Medium, Black)		
Geology - Dip, Bedding (Medium, Green)		
Geology - Dip, Bedding (Medium, Red)		
Geology - Dip, Bedding (Small, Aqua)		
Geology - Dip, Bedding (Small, Black)		
Geology - Dip, Bedding (Small, Green)		
Geology - Dip, Bedding (Small, Red)		
Geology - Dip, Overturned (Medium, Aqua)		
Geology - Dip, Overturned (Medium, Black)		

Geology - Dip, Overturned (Medium, Green)		
Geology - Dip, Overturned (Medium, Red)		
Geology - Dip, Overturned (Small, Aqua)		
Geology - Dip, Overturned (Small, Black)		
Geology - Dip, Overturned (Small, Green)		
Geology - Dip, Overturned (Small, Red)		
Geology - Foliation, Closed (Medium, Aqua)		
Geology - Foliation, Closed (Medium, Black)		
Geology - Foliation, Closed (Medium, Green)		
Geology - Foliation, Closed (Medium, Red)		
Geology - Foliation, Closed (Small, Aqua)		

Geology - Foliation, Closed (Small, Black)		
Geology - Foliation, Closed (Small, Green)		
Geology - Foliation, Closed (Small, Red)		
Geology - Foliation, Open (Medium, Aqua)		
Geology - Foliation, Open (Medium, Black)		
Geology - Foliation, Open (Medium, Green)		
Geology - Foliation, Open (Medium, Red)		
Geology - Foliation, Open (Small, Aqua)		
Geology - Foliation, Open (Small, Black)		
Geology - Foliation, Open (Small, Green)		
Geology - Foliation, Open (Small, Red)		

Geology - Horizontal Bedding (Medium, Aqua)		
Geology - Horizontal Bedding (Medium, Black)		
Geology - Horizontal Bedding (Medium, Green)		
Geology - Horizontal Bedding (Medium, Red)		
Geology - Horizontal Bedding (Small, Aqua)		
Geology - Horizontal Bedding (Small, Black)		
Geology - Horizontal Bedding (Small, Green)		
Geology - Horizontal Bedding (Small, Red)		
Geology - Joint, Closed (Medium, Aqua)		
Geology - Joint, Closed (Medium, Black)		
Geology - Joint, Closed (Medium, Green)		

Geology - Joint, Closed (Medium, Red)		
Geology - Joint, Closed (Small, Aqua)		
Geology - Joint, Closed (Small, Black)		
Geology - Joint, Closed (Small, Green)		
Geology - Joint, Closed (Small, Red)		
Geology - Joint, Open (Medium, Aqua)		
Geology - Joint, Open (Medium, Black)		
Geology - Joint, Open (Medium, Green)		
Geology - Joint, Open (Medium, Red)		
Geology - Joint, Open (Small, Aqua)		
Geology - Joint, Open (Small, Black)		

Geology - Joint, Open (Small, Green)		
Geology - Joint, Open (Small, Red)		
Geology - Vertical Bedding (Medium, Aqua)		
Geology - Vertical Bedding (Medium, Black)		
Geology - Vertical Bedding (Medium, Green)		
Geology - Vertical Bedding (Medium, Red)		
Geology - Vertical Bedding (Small, Aqua)		
Geology - Vertical Bedding (Small, Black)		
Geology - Vertical Bedding (Small, Green)		
Geology - Vertical Bedding (Small, Red)		

BUILT-IN AREA, LINE AND POINT TYPES

This section reviews the area, line and point styles built into Global Mapper.

- Area Styles
  - Area Types
  - Area Fill Patterns
  - Area Border Styles
- Line Styles
  - Line Type Features
  - Drawing Styles
- Point Styles
  - Point Type Features
  - Symbols - Basic
  - Symbols - Geology

Area Styles

Using the Area Styles panel users can configure how areas of a given type will be displayed in Global Mapper. Area fill, border style and color can be modified on a type-by-type basis. The Show Labels for Areas of This Type option allows users to turn area labels off on a type-by-type basis.

Area Types are shown in the Global Mapper Area Types table. Tables showing the Global Mapper Fill Patterns and Border Styles follow the Area Types table.

Global Mapper recognizes five field attributes as containing information for the display appearence of an Area Type. They are:

```
GM_TYPE=
BORDER_COLOR=
BORDER_WIDTH=
BORDER_STYLE=
FILL_COLOR=
FILL_STYLE=
```

The "FILL_ALPHA=" field attribute is recognized by Global Mapper to set an Area Type's transparency. Values for "FILL_ALPHA=" range from 0 (Transparent) to 255 (Opaque). To determine the transparency value setting simply multiply the percentage by 255 and round off to the nearest integer (e.g. 75% transparency 0.75 x 255 = 191.25, use 191).

As an example, the default field attributes for the Anchorage Area Type are:

```
GM_TYPE=Anchorage Area
BORDER_COLOR=RGB(255,0,255)
BORDER_WIDTH=1
BORDER_STYLE=Comb (Right Only)
FILL_COLOR=RGB(255,0,255)
FILL_STYLE=No Fill
```

To change the type's transparency to 35% the FILL_ALPHA field attribute value should be set equal to 89 (0.35 x 255 = 89.25).

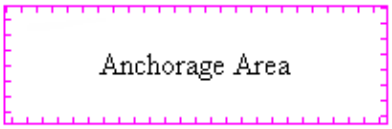
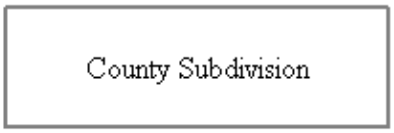
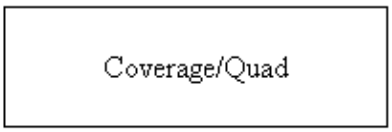
```
GM_TYPE=Anchorage Area
```

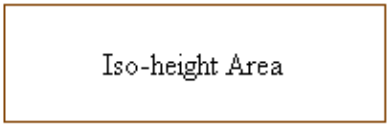
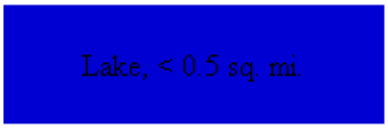
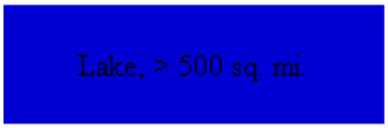
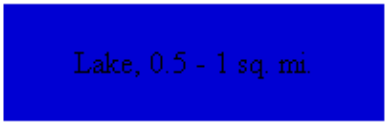
```
BORDER_COLOR=RGB(255,0,255)
BORDER_WIDTH=1
BORDER_STYLE=Comb (Right Only)
FILL_COLOR=RGB(255,0,255)
FILL_STYLE=No Fill
FILL_ALPHA=89
```

Area Types

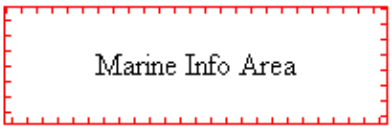
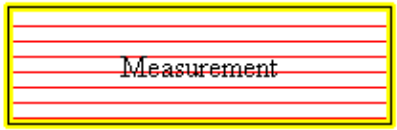
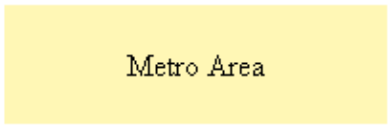
Global Mapper's View --> Background Color... color designation influences which areas can be seen. Any area whose color is the same as the Global Mapper Backgrond Color will not be seen. Example, for a white Background Color (RGB 255,255,255), the Snow or Glacier Area will not be visible.

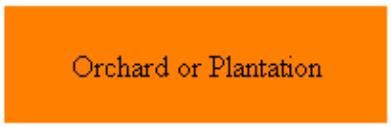
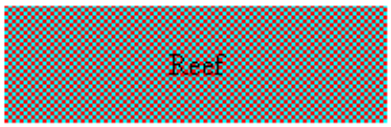
Global Mapper Built-In Area Types

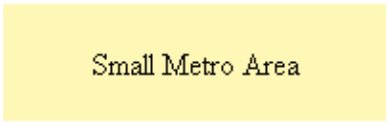
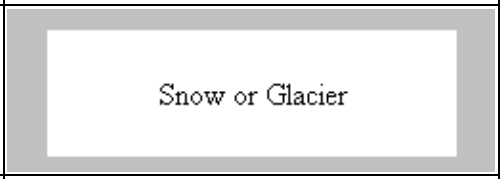
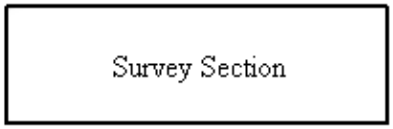
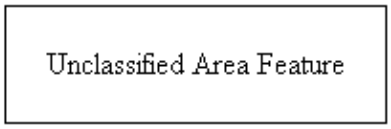
Area Type	Example	Fill Pattern	Fill Color	Border Width	Border Style	Border Color
Anchorage Area		No Fill	0,0,0	1	Comb (Right Only)	0,0,0
City Park		Solid Fill	0,235,0	1	Null	0,0,0
Country		No Fill	0,0,0	1	Solid	0,0,0
County		No Fill	0,0,0	2	Solid	0,0,0
County Subdivision		No Fill	0,0,0	2	Solid	128,128,128
Coverage/Quad		No Fill	0,0,0	1	Solid	0,0,0
Cropland		Solid Fill	183,183,0	1	Null	0,0,0

Dry Lakebed		Intermittent Water Pattern	132,130,255	1	Null	0,0,0
Intermittent Lake		Intermittent Water Pattern	132,130,255	1	Null	0,0,0
Intermittent Stream/River		Intermittent Water Pattern	132,130,255	1	Null	0,0,0
Intertidal Area		Solid Fill	192,240,188	1	Null	0,0,0
Island		No Fill	0,0,0	1	Solid	0,0,0
Isobath Area		Solid Fill	132,130,255	1	Null	0,0,0
Iso-height Area		No Fill	0,0,0	1	Solid	128,64,0
Lake, < 0.5 sq. mi.		Solid Fill	0,0,211	1	Null	0,0,0
Lake, > 500 sq. mi.		Solid Fill	0,0,211	1	Null	0,0,0
Lake, 0.5 - 1 sq. mi.		Solid Fill	0,0,211	1	Null	0,0,0

Lake, 1 - 5 sq. mi.	Lake, 1 - 5 sq. mi.	Solid Fill	0,0,211	1	Null	0,0,0
Lake, 10 - 30 sq. mi.	Lake, 10 - 30 sq. mi.	Solid Fill	0,0,211	1	Null	0,0,0
Lake, 100 - 250 sq. mi.	Lake, 100 - 250 sq. mi.	Solid Fill	0,0,211	1	Null	0,0,0
Lake, 250 - 500 sq. mi.	Lake, 250 - 500 sq. mi.	Solid Fill	0,0,211	1	Null	0,0,0
Lake, 30 - 100 sq. mi.	Lake, 30 - 100 sq. mi.	Solid Fill	0,0,211	1	Null	0,0,0
Lake, 5 - 10 sq. mi.	Lake, 5 - 10 sq. mi.	Solid Fill	0,0,211	1	Null	0,0,0
Lake, Unknown Area	Lake, Unknown Area	Solid Fill	0,0,211	1	Null	0,0,0
Land Area	Land Area	Solid Fill	220,212,148	1	Null	0,0,0
Land Grant	Land Grant	No Fill	0,0,0	2	Null	0,0,0
Large Metro Area	Large Metro Area	Solid Fill	255,247,181	1	Null	0,0,0

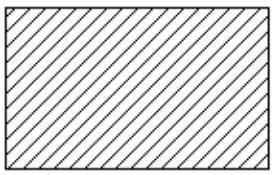
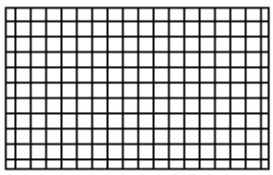
Major National Park		Solid Fill	0,235,0	1	Null	0,0,0
Major River		Solid Fill	0,0,211	1	Null	0,0,0
Major State Park		Solid Fill	0,235,0	1	Null	0,0,0
Map Catalog Layer Bounds		Diagonal Cros-Hatch	255,64,64	1	Solid	0,0,255
Marine Info Area		No Fill	255,0,255	1	Comb (Right Only)	255,0,0
Marine Traffic Area		Backwards Diagonal Cross-Hatch	255,0,255	1	Solid	0,0,0
Measurement		Horizontal Hatch	255,0,0	5	Striped	255,255,0
Metro Area		Solid Fill	255,247,181	1	Null	0,0,0
Minor River		Solid Fill	0,0,211	1	Null	0,0,0
Misc. Manmade Structure		Solid Fill	255,64,64	1	Null	0,0,0

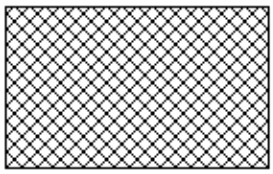
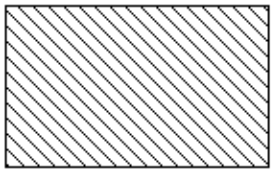
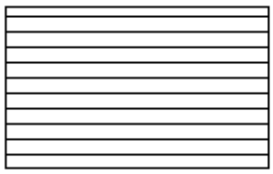
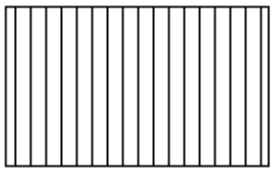
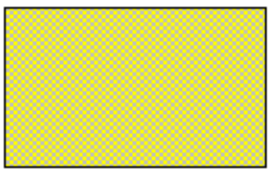
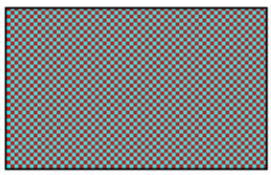
National Park		Solid Fill	0,235,0	1	Null	0,0,0
Ocean		Solid Fill	0,0,211	1	Null	0,0,0
Orchard or Plantation		Solid Fill	255,128,0	1	Null	0,0,0
Range Ring		No Fill	0,0,0	3	Solid	0,0,0
Reef		Coral Pattern	255,0,0	1	Null	0,0,0
Regional River		Solid Fill	0,0,211	1	Null	0,0,0
Reservation		Solid Fill	255,0,0	1	Null	0,0,0
Rock		Solid Fill	104,133,138	1	Null	0,0,0
Salt		Salt Pattern	192,102,192	1	Null	0,0,0
Sand		Sand Pattern	255,255,0	1	Null	0,0,0

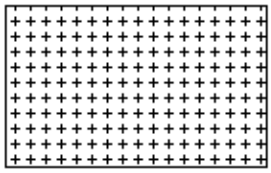
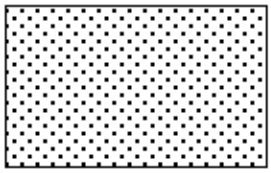
Scattered Trees		Solid Fill	0,255,0	1	Null	0,0,0
Scrub Area		Diagonal Cross-Hatch	0,128,128	1	Null	0,0,0
Small Metro Area		Solid Fill	255,247,181	1	Null	0,0,0
Snow or Glacier		Solid Fill	255,255,255	1	Null	0,0,0
State		No Fill	0,0,0	3	Solid	0,0,0
State Park		Solid Fill	0,235,0	1	Null	0,0,0
Survey Section		No Fill	0,0,0	2	Solid	0,0,0
TIN Face Area		No Fill	0,0,0	1	Solid	0,0,0
Tundra		Solid Fill	145,177,196	1	Null	0,0,0
Unclassified Area Feature		No Fill	0,0,0	1	Solid	0,0,0

Unknown Area Type	Unknown Area Type	No Fill	0,0,0	1	Solid	0,0,0
View Shed Coverage Area	View Shed Coverage Area	No Fill	0,0,0	1	Solid	0,0,0
Wetland	Wetland	Solid Fill	125,191,167	1	Null	0,0,0
Wooded Area	Wooded Area	Backwards Diagonal Cross-Hatch	165,145,97	1	Null	0,0,0

Area Fill Patterns

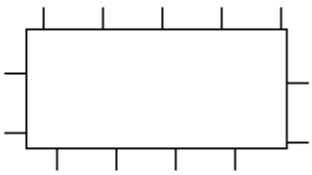
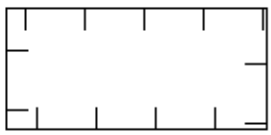
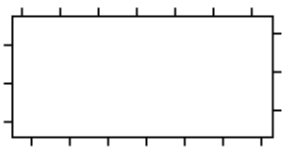
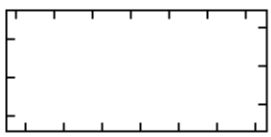
Global Mapper Fill Patterns	
Fill Pattern	**Example**
No Fill	
Solid Fill	
Backwards Diagonal Cross-Hatch	
Cross-Hatch	

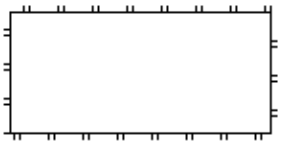
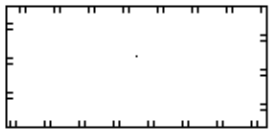
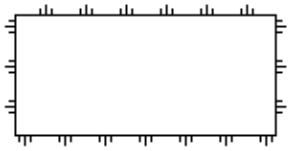
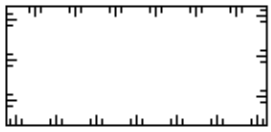
Diagonal Cross-Hatch	
Forward Diagonal Cross-Hatch	
Horizontal Hatch	
Vertical Hatch	
Sand_Pattern	
Intermittent_Water_Pattern	
Salt_Pattern	
Coral_Pattern	

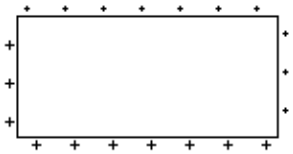
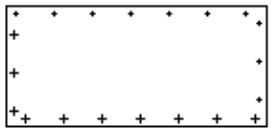
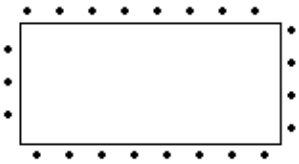
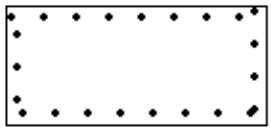
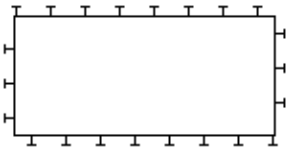
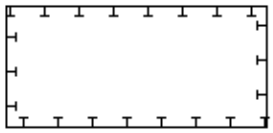
Black_Cross_Pattern	
Black_Dot_Pattern	

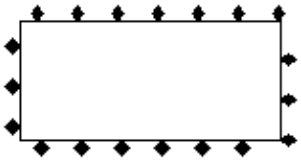
Area Border Styles

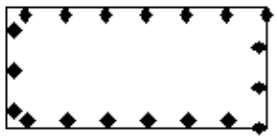
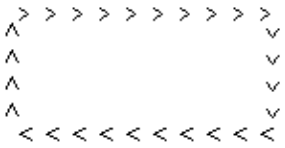
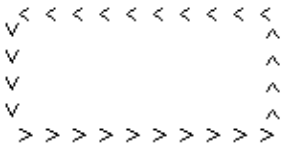
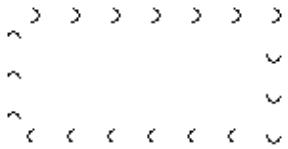
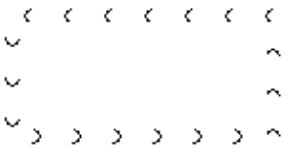
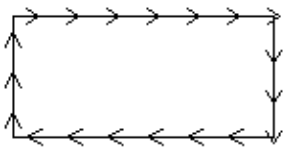
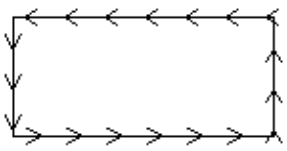
Global Mapper Border Styles	
Border Style	**Example**
Solid	
Dash	
Dot	
Dash - Dot	
Dash - Dot - Dot	

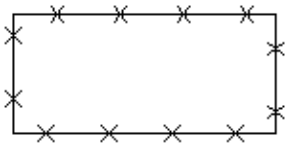
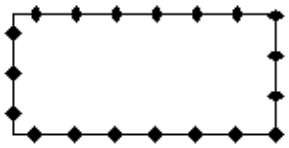
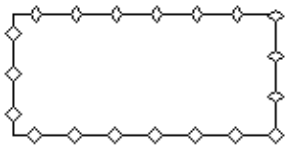
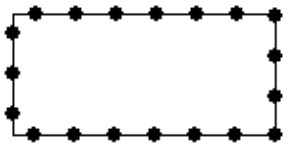
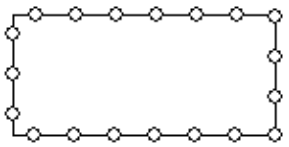
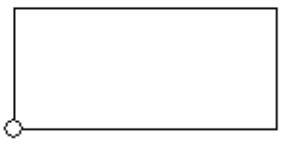
Null	
Railroad	
Striped	
Comb (Left Only)	
Comb (Right Only)	
Comb (Long Teeth, Left Only)	
Comb (Long_Teeth, Right Only)	
Comb (Widely Spaced, Left Only)	
Comb (Widely Spaced, Right Only)	

Comb (Long & Short Teeth, Left Only)	
Comb (Long & Short Teeth, Right Only)	
Comb (Double Teeth, Left Only)	
Comb (Double Teeth, Right Only)	
Comb (Triplet, Left Only)	
Comb (Triplet, Right Only)	
Rake (Narrow Spaced, Left Only)	
Rake (Narrow Spaced, Right Only)	
Rake (Widely Spaced, Left Only)	

Rake (Widely Spaced, Right Only)	
Solid with Minus Signs on Left	
Solid with Minus Signs on Right	
Solid with Plus Signs on Left	
Solid with Plus Signs on Right	
Solid with Dots on Left	
Solid with Dots on Right	
Solid with Ts on Left	
Solid with Ts on Right	

Solid with Rectangles on Left	
Solid with Rectangles on Right	
Solid with Squares on Left	
Solid with Squares on Right	
Half Circles (Tightly Spaced, Left Only)	
Half Circles (Tightly Spaced, Right Only)	
Half Circles (Widely Spaced, Left Only)	
Half Circles (Widely Spaced, Right Only)	
Solid with Diamonds on Left	

Solid with Diamonds on Right	
V Track (Opens Towards End of Null Line)	
V Track (Opens Towards Start of Null Line)	
C Track (Opens Towards End of Line)	
C Track (Opens Towards Start of Line)	
Arrow Track (Points Towards Start of Line)	
Arrow Track (Points Towards End of Line)	
V Track (Opens Towards End of Solid Line)	
V Track (Opens Towards Start of Solid Line)	

Solid with Xs Through Line	
Solid with Diamonds along Line	
Solid with Empty Diamonds along Line	
Solid with Circles along Line	
Solid with Empty Circles along Line	
Solid with Arrow Pointing to Start	
Solid with Arrow Pointing to End	
Solid with Empty Circle at Start	
Solid with Empty Circle at End	

Solid with Black Edges	

Line Styles

Using the Line Styles panel users can configure how lines of a given type will be displayed in Global Mapper. The line style, width, color, and label font can be modified on a type-by-type basis. In addition, the Show Labels for Lines of This Type option allows users to turn line labels off on a type-by-type basis.

The Display Roads As Fat Lines When Zoomed In option allows users to turn on/off the "fattening" of road lines when zoom in tight on them.

Global Mapper's Line Types are listed in the Global Mapper Line Types table. Drawing Styles are listed in the Global Mapper Drawing Styles table.

Global Mapper recognizes four field attributes as containing information for the display appearence of a Line Type. They are:

```
GM_TYPE=Airport Runway
LINE_WIDTH=1
LINE_COLOR=RGB(0,0,0)
LINE_STYLE=Solid
```

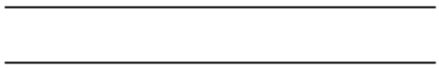
The "LINE_STYLE=" field attribute can be set to any one of the 60 Drawing Styles shown in the Global Mapper Drawing Styles table.

Line Types

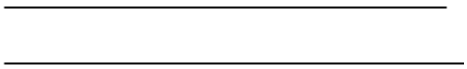
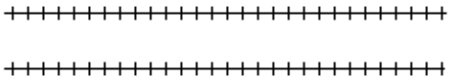
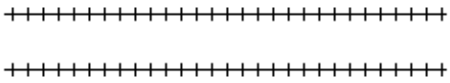
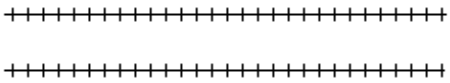
Upper line shows line types normal appearance. Lower line shows how line type appears when "Display Roads As Fat Lines When Zoomed In" option is checked and display is zoomed in.

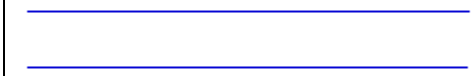
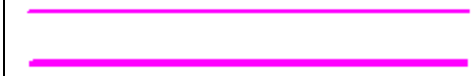
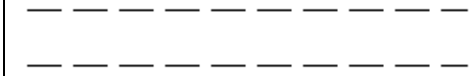
Global Mapper's View --> Background Color... color designation influences which lines can be seen. Any line whose color is the same as the Global Mapper Backgrond Color will not be seen. Example, for a white Background Color (RGB 255,255,255), the Processing/Closure Line will not be visible.

Global Mapper Built-In Line Types				
Line Type	**Example**	**Drawing Style**	**Line Width**	**Line Color**
Airport Runway		Solid	1	0,0,0
Alley or Driveway		Solid	1	128,128,128

Arterial Road		Solid	2	0,128,0
Bathymetric Contour, Intermediate		Solid	2	132,130,255
Bathymetric Contour, Major		Solid	3	132,130,255
Bathymetric Contour, Minor		Solid	1	132,130,255
Bathymetric Contour, Supplementary		Solid	1	132,130,255
City Boundary		Solid	1	0,0,0
Collector Road		Solid	1	255,128,0
Contour Line, Intermediate		Solid	2	128,64,0
Contour Line, Major		Solid	3	128,64,0
Contour Line, Minor		Solid	1	128,64,0
Contour Line, Supplementary		Solid	1	128,64,0
County Route		Solid	2	255,0,255

Deleted Line		Dash	1	192,192,192
Digitizer Tool Line		Striped	5	255,255,0
Dry Stream or River		Dot	1	0,0,211
Ferry Route		Solid	1	255,128,0
Grid Line		Solid	1	128,128,128
Grid Line - Major		Solid	2	128,128,128
Grid Line - Minor		Solid	1	128,128,128
Intermittent Stream or River		Dash	1	0,0,211
International Political Boundary		Solid	6	0,0,0
Interstate		Solid	3	132,130,255
Invisible Boundary		Dot	1	192,192,192
Major Political Boundary (State)		Solid	5	128,128,128

Major/US Highway		Solid	2	255,64,64
Marine Route		Solid	1	0,0,0
Measurement		Striped	5	255,255,0
Minor Political Boundary (County)		Solid	4	0,0,0
Park Boundary		Solid	1	0,255,0
Pipeline		Dash	1	128,128,128
Powerline		Dash - Dot	1	128,128,128
Processing/Closure Line		Solid	2	255,255,255
Railroad		Railroad	1	0,0,0
Railroad, Class 1A		Railroad	1	0,0,0
Railroad, Class 1B		Railroad	1	0,0,0
Ramp		Solid	1	0,255,255

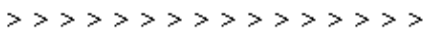
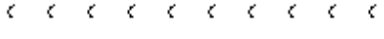
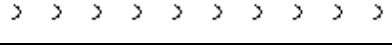
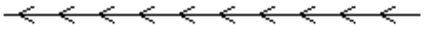
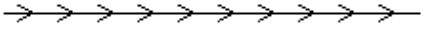
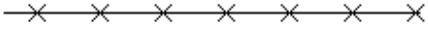
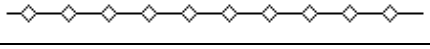
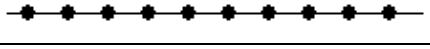
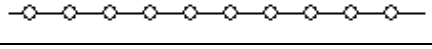
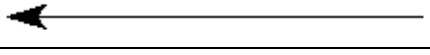
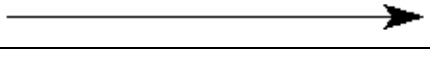
Residential Road		Solid	1	128,128,128
River, < 20 km		Solid	1	0,0,211
River, > 250 km		Solid	3	0,0,211
River, 100 - 250 km		Solid	3	0,0,211
River, 20 - 50 km		Solid	2	0,0,211
River, 50 - 100 km		Solid	2	0,0,211
River, Unknown Length		Solid	1	0,0,211
Selected Line		Dash	1	2550,0,0
Shoreline		Solid	1	0,0,0
State Highway		Solid	2	255,0,255
Stream		Solid	1	0,0,211
Tracklog		Dash	1	0,0,0

Trail		Solid	1	128,128,128
Unclassified Line Feature		Solid	1	128,128,128
Unknown Line Type		Solid	1	0,0,0
Unpaved Road		Solid	1	128,128,128

Drawing Styles

Global Mapper Drawing Styles	
Drawing Style	**Example**
Solid	
Dash	
Dot	
Dash - Dot	
Dash - Dot - Dot	
Null	
Railroad	
Striped	
Comb (Left Only)	
Comb (Right Only)	
Comb (Long Teeth, Left Only)	
Comb (Long Teeth, Right Only)	
Comb (Widely Spaced, Left Only)	
Comb (Widely Spaced, Right Only)	
Comb (Long & Short Teeth, Left Only)	
Comb (Long & Short Teeth, Right Only)	

Comb (Double Teeth, Left Only)	
Comb (Double Teeth, Right Only)	
Comb (Triplet, Left Only)	
Comb (Triplet, Right Only)	
Rake (Narrow Spaced, Left Only)	
Rake (Narrow Spaced, Right Only)	
Rake (Widely Spaced, Left Only)	
Rake (Widely Spaced, Right Only)	
Solid with Minus Signs on Left	
Solid with Minus Signs on Right	
Solid with Plus Signs on Left	
Solid with Plus Signs on Right	
Solid with Dots on Left	
Solid with Dots on Right	
Solid with Ts on Left	
Solid with Ts on Right	
Solid with Rectangles on Left	
Solid with Rectangles on Right	
Solid with Squares on Left	
Solid with Squares on Right	
Half Circles (Tightly Spaced, Left Only)	
Half Circles (Tightly Spaced, Right Only)	
Half Circles (Widely Spaced, Left Only)	
Half Circles (Widely Spaced, Right Only)	
Solid with Diamonds on Left	
Solid with Diamonds on Right	
V Track (Opens Towards End of Null Line)	

V Track (Opens Towards Start of Null Line)	
C Track (Opens Towards End of Line)	
C Track (Opens Towards Start of Line)	
Arrow Track (Points Towards Start of Line)	
Arrow Track (Points Towards End of Line)	
V Track (Opens Towards End of Solid Line)	
V Track (Opens Towards Start of Solid Line)	
Solid with Xs through Line	
Solid with Diamonds along Line	
Solid with Empty Diamonds along Line	
Solid with Circles along Line	
Solid with Empty Circles along Line	
Solid with Arrow Pointing to Start	
Solid with Arrow Pointing to End	
Solid with Empty Circle at Start	
Solid with Empty Circle at End	
Solid with Black Edges	

Point Styles

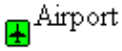
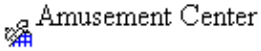
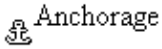
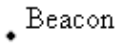
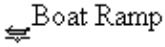
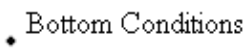
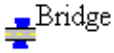
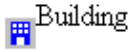
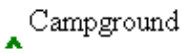
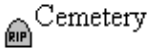
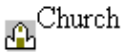
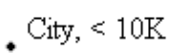
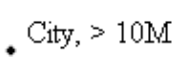
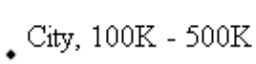
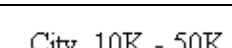
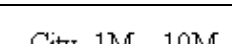
Using the Point Styles panel users can configure what symbol will be used to display points of a given type. In addition, the Show Labels for Points of This Type option allows a user to turn point labels off on a type-by-type basis. The Custom Symbols section allows users to create new symbols from their own bitmap and icon files which they can then use as the symbol to display for a given type.

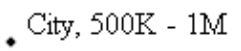
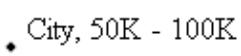
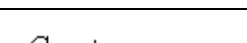
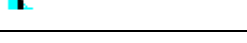
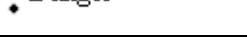
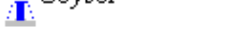
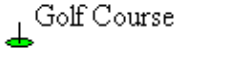
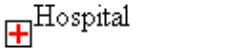
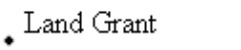
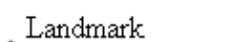
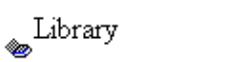
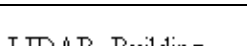
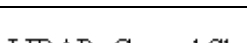
Global Mapper's Point Type Features are listed in the Global Mapper Point Type Features table. Symbols are listed in the Global Mapper Symbols table.

Global Mapper recognizes two field attributes as containing information for the display appearence of a Point Type. They are:

```
GM_TYPE=Address Label
POINT_SYMBOL=Dot - Red
```

Point Type Features

Global Mapper Built-In Point Type Features		
Point Type	**Example**	**Symbol**
Address Label		Dot - Red
Airport		Airport
Amusement Center		Amusement Center
Anchorage		Marina
Arch		Arch
Bank		Bank
Beacon		Dot
Boat Ramp		Boat Ramp
Bottom Conditions		Dot
Bridge		Bridge
Building		School
Buoy		Dot
Campground		Campground
Cemetery		Cemetery
Church		Church
City, < 10K		Dot
City, > 10M		Dot
City, 100K - 500K		Dot
City, 10K - 50K		Dot
City, 1M - 10M		Dot

City, 500K - 1M		Dot
City, 50K - 100K		Dot
City, Population Unknown		Dot
Cliff		Cliff
Country		Dot
County		Dot
Dam		Dam
Danger		Dot
First Aid		Hospital
Geyser		Geyser
Golf Course		Golf
Hospital		Hospital
Island		Dot
Land Grant		Dot
Landmark		Dot
Library		Library
LIDAR, Building		Elevation Shaded
LIDAR, Ground Shot		Elevation Shaded
LIDAR, Power Lines		Elevation Shaded
LIDAR, Towers or Poles		Elevation Shaded
LIDAR, Unuclassified		Elevation Shaded

LIDAR, Vegetation (High)	LIDAR, Vegetation (High)	Elevation Shaded
LIDAR, Vegetation (Low)	LIDAR, Vegetation (Low)	Elevation Shaded
LIDAR, Vegetation (Medium)	LIDAR, Vegetation (Medium)	Elevation Shaded
LIDAR, Water	LIDAR, Water	Elevation Shaded
Lighthouse	Lighthouse	Lighthouse
Lodging	Lodging	Lodging
Marina	Marina	Marina
Military Installation	Military Installation	Dot
Mine	Mine	Mine
Park	Park	Park
Picnic Area	Picnic Area	Picnic Area
Picture	Picture	Scenic View
Post Office	Post Office	Post Office
Resturant	Resturant	Resturant
Restrooms	Restrooms	Restrooms
Rock	Rock	Rock
School	School	School
Shopping	Shopping	Shopping
Spot Elevation	Spot Elevation	Spot Elevation
Spot Sounding	Spot Sounding	No Symbol
Stadium	Stadium	Stadium

State	State	Dot
Stream Origin	Stream Origin	Stream Origin
Summit	Summit	Summit
Swimming Area	Swimming Area	Swimming Area
Tower	Tower	Tower
Unclassified Point Feature	Unclassified Point Feature	Dot
Unknown Point Feature	Unknown Point Feature	Dot
Waterfall	Waterfall	Waterfall
Waypoint	Waypoint	Dot
Weigh Station	Weight Station	Weigh Station
Well	Well	Well
Wreck	Wreck	Wreck

Symbols

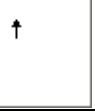
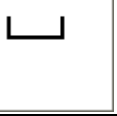
Global Mapper Built-In Symbols		
Name	**Symbol**	**2x Sym Details**
Airport		
Amusement Center		
Arch		
Auto Rental		
Bank		
Beacon		
Big Red X		

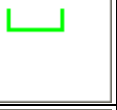
Big Yellow X		
Boat Ramp		
Bridge		
Bullseye		
Campground		
Cemetry		
Church		
Cliff		
Dam		
Danger Area		
Deer		
Diag Crosshair - Red		
Diag Crosshair - Yellow		
Dot		
Dot - Blue		
Dot - Green		
Dot - Red		
Dot - White		
Dot - Yellow		
Elevation Shaded		
Fish		

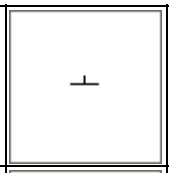
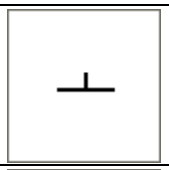
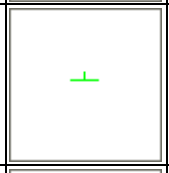
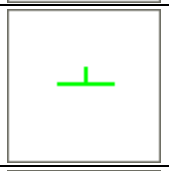
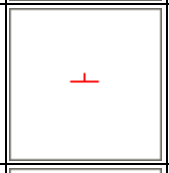
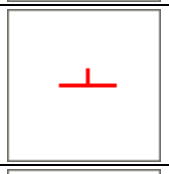
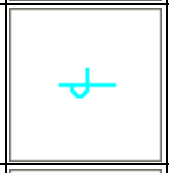
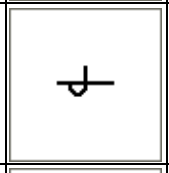
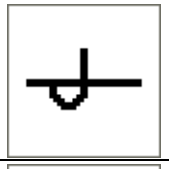
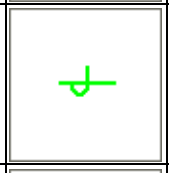
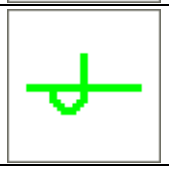
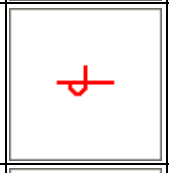
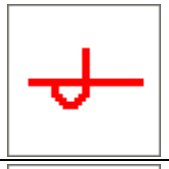
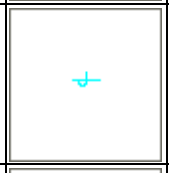
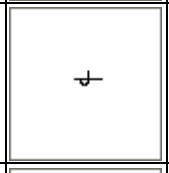
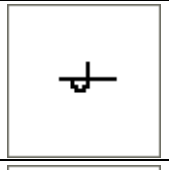
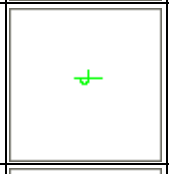
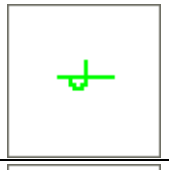
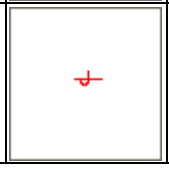
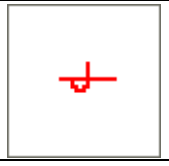
Fuel		
Geyser		
Golf		
Hospital		
Library		
Lighthouse		
Little Blue X		
Lodging		
Marina		
Mine		
No Symbol		
Park		
Phone		
Picnic Area		
Post Office		
Resturant		
Restroom		
Rock		
Scenic View		
School		
Shopping		

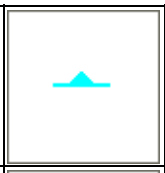
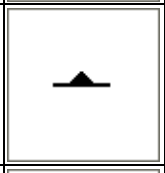
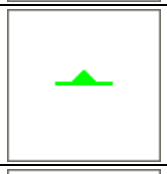
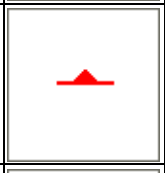
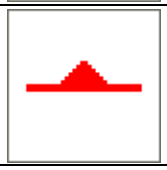
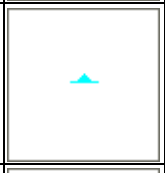
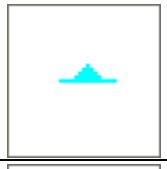
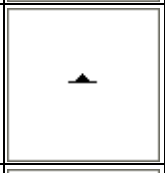
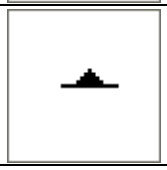
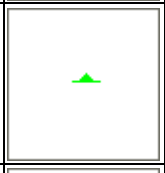
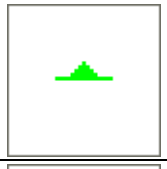
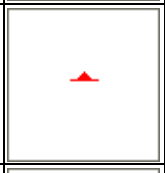
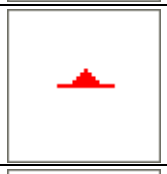
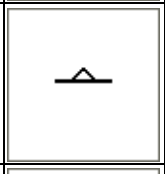
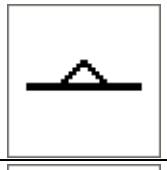
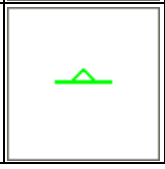
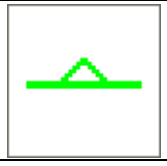
Skiing		
Spot Elevation		
Stadium		
Stream Origin		
Summit		
Swimming Area		
Tower		
Waterfall		
Weigh Station		
Well		
Well - Active		
Well - Active at TD		
Well - Dryhole		
Well - Gas		
Well - Injection		
Well - Location		
Well - Oil		
Well - Oil and Gas		
Well - Suspended		
Wreck		

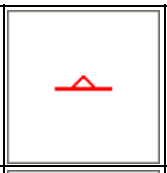
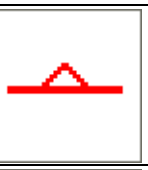
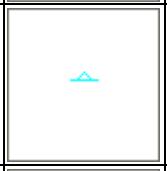
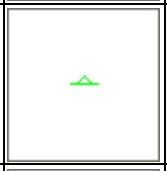
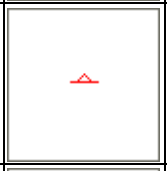
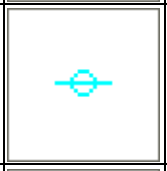
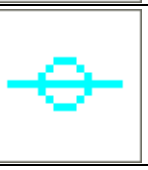
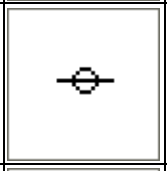
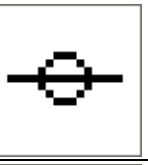
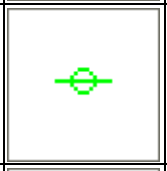
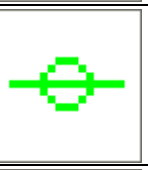
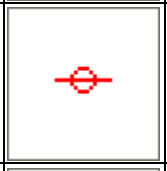
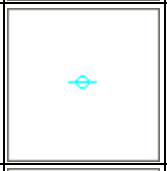
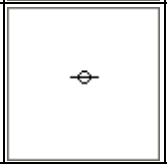
Symbols - Geology

Global Mapper Built-In Symbols		
Name	**Symbol**	**2X Sym Details**
Geology - Arrow (Medium, Aqua)		
Geology - Arrow (Medium, Black)		
Geology - Arrow (Medium, Green)		
Geology - Arrow (Medium, Red)		
Geology - Arrow (Small, Aqua)		
Geology - Arrow (Small, Black)		
Geology - Arrow (Small, Green)		
Geology - Arrow (Small, Red)		
Geology - Cleavage (Medium, Aqua)		
Geology - Cleavage (Medium, Black)		

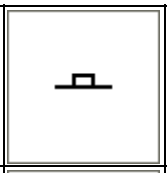
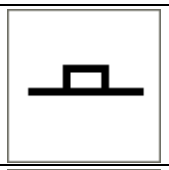
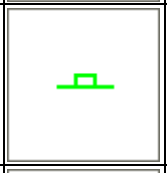
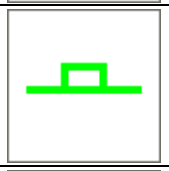
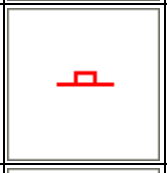
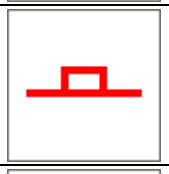
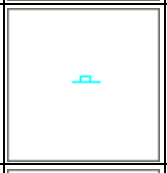
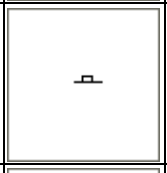
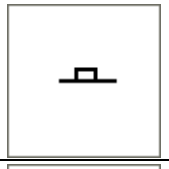
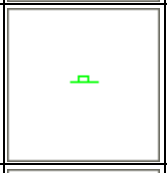
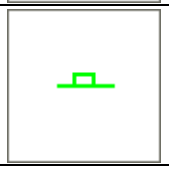
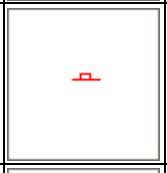
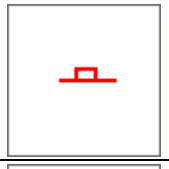
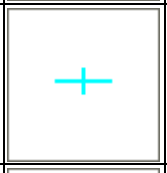
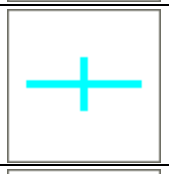
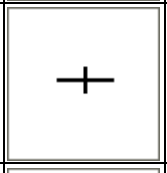
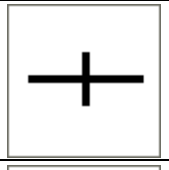
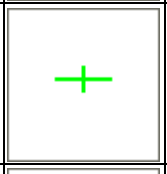
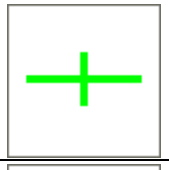
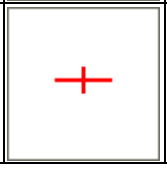
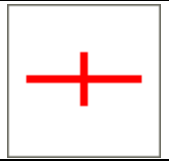
Geology - Cleavage (Medium, Green)		
Geology - Cleavage (Medium, Red)		
Geology - Cleavage (Small, Aqua)		
Geology - Cleavage (Small, Black)		
Geology - Cleavage (Small, Green)		
Geology - Cleavage (Small, Red)		
Geology - Dip, Bedding (Medium, Aqua)		
Geology - Dip, Bedding (Medium, Black)		
Geology - Dip, Bedding (Medium, Green)		
Geology - Dip, Bedding (Medium, Red)		
Geology - Dip, Bedding (Small, Aqua)		

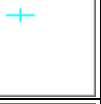
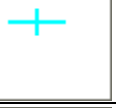
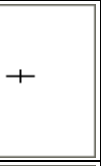
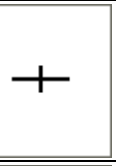
Geology - Dip, Bedding (Small, Black)		
Geology - Dip, Bedding (Small, Green)		
Geology - Dip, Bedding (Small, Red)		
Geology - Dip, Overturned (Medium, Aqua)		
Geology - Dip, Overturned (Medium, Black)		
Geology - Dip, Overturned (Medium, Green)		
Geology - Dip, Overturned (Medium, Red)		
Geology - Dip, Overturned (Small, Aqua)		
Geology - Dip, Overturned (Small, Black)		
Geology - Dip, Overturned (Small, Green)		
Geology - Dip, Overturned (Small, Red)		

Geology - Foliation, Closed (Medium, Aqua)		
Geology - Foliation, Closed (Medium, Black)		
Geology - Foliation, Closed (Medium, Green)		
Geology - Foliation, Closed (Medium, Red)		
Geology - Foliation, Closed (Small, Aqua)		
Geology - Foliation, Closed (Small, Black)		
Geology - Foliation, Closed (Small, Green)		
Geology - Foliation, Closed (Small, Red)		
Geology - Foliation, Open (Medium, Aqua)		
Geology - Foliation, Open (Medium, Black)		
Geology - Foliation, Open (Medium, Green)		

Geology - Foliation, Open (Medium, Red)		
Geology - Foliation, Open (Small, Aqua)		
Geology - Foliation, Open (Small, Black)		
Geology - Foliation, Open (Small, Green)		
Geology - Foliation, Open (Small, Red)		
Geology - Horizontal Bedding (Medium, Aqua)		
Geology - Horizontal Bedding (Medium, Black)		
Geology - Horizontal Bedding (Medium, Green)		
Geology - Horizontal Bedding (Medium, Red)		
Geology - Horizontal Bedding (Small, Aqua)		
Geology - Horizontal Bedding (Small, Black)		

Geology - Horizontal Bedding (Small, Green)		
Geology - Horizontal Bedding (Small, Red)		
Geology - Joint, Closed (Medium, Aqua)		
Geology - Joint, Closed (Medium, Black)		
Geology - Joint, Closed (Medium, Green)		
Geology - Joint, Closed (Medium, Red)		
Geology - Joint, Closed (Small, Aqua)		
Geology - Joint, Closed (Small, Black)		
Geology - Joint, Closed (Small, Green)		
Geology - Joint, Closed (Small, Red)		
Geology - Joint, Open (Medium, Aqua)		

Geology - Joint, Open (Medium, Black)		
Geology - Joint, Open (Medium, Green)		
Geology - Joint, Open (Medium, Red)		
Geology - Joint, Open (Small, Aqua)		
Geology - Joint, Open (Small, Black)		
Geology - Joint, Open (Small, Green)		
Geology - Joint, Open (Small, Red)		
Geology - Vertical Bedding (Medium, Aqua)		
Geology - Vertical Bedding (Medium, Black)		
Geology - Vertical Bedding (Medium, Green)		
Geology - Vertical Bedding (Medium, Red)		

Geology - Vertical Bedding (Small, Aqua)		
Geology - Vertical Bedding (Small, Black)		
Geology - Vertical Bedding (Small, Green)		
Geology - Vertical Bedding (Small, Red)		

Built-in Datums

The following is a list of the datums built in to Global Mapper and the transformation parameters used to convert those datums. All parameters are given with respect to transforming from the given datum to WGS-84.

Datum Name	EPSG Code	Ellipsoid Name	dX
ADINDAN	6201	Clarke 1880	-1
AIN EL ABD (BAHRAIN)	6204	International 1909 (Hayford/Intl 1924)	-1
AIN EL ABD (SAUDI ARABIA)	6204	International 1909 (Hayford/Intl 1924)	-1
AMERICAN SAMOA 1962	6169	Clarke 1866	-1
ARATU (BRAZIL)	6208	International 1909 (Hayford/Intl 1924)	-1
ARC1950	6209	Clarke 1880	-1
ARC1960	6210	Clarke 1880	-1
ASTRO B4 (SOROL ATOLL)	Unknown	International 1909 (Hayford/Intl 1924)	1
ASTRO BEACON	Unknown	International 1909 (Hayford/Intl 1924)	1
ASTRO DOS 71/4	Unknown	International 1909 (Hayford/Intl 1924)	-3
ASTRONOMIC STATION 1952	Unknown	International 1909 (Hayford/Intl 1924)	1
ATS77 (NOVA SCOTIA)	6122	ATS77	
AUSTRALIAN GEODETIC 1966	6202	Australian National	
AUSTRALIAN GEODETIC 1984	6203	Australian National	
BD72 (BELGIUM 1972)	6313	International 1909 (Hayford/Intl 1924)	-9
BEIJING 1954	6214	Krassovsky	
BESSEL 1841 (ITALIA) [Castanea d. F.]	Unknown	Bessel 1841	
BESSEL 1841 (ITALIA) [Genova]	Unknown	Bessel 1841	
BESSEL 1841 (ITALIA) [Monte Mario]	Unknown	Bessel 1841	
BESSEL 1841 [GREENWICH]	Unknown	Bessel 1841	
BOGOTA OBSERVATORY	6218	International 1909 (Hayford/Intl 1924)	3
BUKIT RIMPAH	6219	Bessel 1841	-3
CAMACUPA	6220	Clarke 1880 (RGS)	-4
CAMP AREA ASTRO	6715	International 1909 (Hayford/Intl 1924)	-1
CAMPO INCHAUSPE (ARGENTINA)	6221	International 1909 (Hayford/Intl 1924)	-1
CAPE	6222	Clarke 1880	-1
CARTHAGE	6223	Clarke 1880	-2
CHAD (WG1998)	Unknown	WGS72	
CLARKE 1866 AUTHALIC SPHERE	Unknown	Sphere Radius 6370997 m	
CORREGO ALEGRE (BRAZIL)	6225	International 1909 (Hayford/Intl 1924)	-2
D-48 SLOVENIA	Unknown	Bessel 1841	6
DEALUL PISCULUI 1970	6317	Krassovsky	
DEIR EZ ZOR (SYRIA)	6227	Clarke 1880 (IGN)	-
DUTCH (RD)	6289	Bessel 1841	5
EASTER ISLAND 1967	6719	International 1909 (Hayford/Intl 1924)	2

ED50	6230	International 1909 (Hayford/Intl 1924)	-
ED50 (ENGLAND)	6230	International 1909 (Hayford/Intl 1924)	-
ED50 (FINLAND/NORWAY)	6230	International 1909 (Hayford/Intl 1924)	-
ED50 (GREECE)	6230	International 1909 (Hayford/Intl 1924)	-
ED50 (ITALIA)	6230	International 1909 (Hayford/Intl 1924)	-
ED50 (NORTH SEA)	6230	International 1909 (Hayford/Intl 1924)	-
ED50 (NORWAY OFFSHORE - N62)	6230	International 1909 (Hayford/Intl 1924)	-1
ED50 (NORWAY OFFSHORE - S62)	6230	International 1909 (Hayford/Intl 1924)	-
ED50 (SICILIA)	6230	International 1909 (Hayford/Intl 1924)	-
ED50 (SPAIN/PORTUGAL)	6230	International 1909 (Hayford/Intl 1924)	
ED79	6668	International 1967	-
ED87	6231	International 1909 (Hayford/Intl 1924)	-
EGYPT 1907	6229	Helmert 1906	-1
EGYPT GULF OF SUEZ S-650 TL	6706	Helmert 1906	-1
ESTIONIA 1997	6180	GRS 1980	
ETRF2000 - RDN	6326	GRS 1980	
ETRS89	6258	GRS 1980	
FD 1958 (IRAQ)	6132	Clarke 1880 (RGS)	-2
FINLAND/HAYFORD	6123	International 1909 (Hayford/Intl 1924)	-
GDA 94 (AUSTRALIAN GEODETIC 1994)	6283	GRS 1980	
GDM2000 (MALAYSIA)	6742	GRS 1980	
GGRS87 (GREECE)	6121	GRS 1980	-1
GOOGLE MAPS (SPHERE RADIUS 6378137)	Unknown	Sphere Radius 6378137 m	
GRS80 ELLIPSOID	6326	GRS 1980	
GUAM 1963	6675	Clarke 1866	-1
HARTEBEESTHOEK 1994 (S. AFRICA)	6148	GRS 1980	
HERAT NORTH (AFGHANISTAN)	6255	International 1909 (Hayford/Intl 1924)	-3
HERMANNSKOGEL	Unknown	Bessel 1841	6
HJORSEY 1955	6658	International 1909 (Hayford/Intl 1924)	-
HONG KONG 1963	6738	International 1909 (Hayford/Intl 1924)	-1
HONG KONG 1980	6611	International 1909 (Hayford/Intl 1924)	-1
HU TZU SHAN	6236	International 1909 (Hayford/Intl 1924)	-6
HUNGARIAN DATUM 1972	6237	GRS 1967 (Indonesia 1974)	
IGN72 GRANDE TERRE (NEW CALEDONIA)	6634	International 1909 (Hayford/Intl 1924)	
INDIAN (BANGLADESH)	Unknown	Everest 1830	2
INDIAN (MEAN VALUE)	Unknown	Everest 1830	1
INDIAN (NEPAL)	6146	Everest 1956	2
INDIAN (THAILAND)	Unknown	Everest 1830	2
INDIAN 1954	6239	Everest 1830	2
INDIAN 1975	6240	Everest 1830	2
INDONESIA 1974	6238	GRS 1967 (Indonesia 1974)	-
IRELAND 1965	Unknown	Modified Airy	5

IRELAND 1965 (1975 ADJUSTMENT)	Unknown	Modified Airy	4
IRENET95	6173	GRS 1980	
ISN93 (ICELAND)	6659	GRS 1980	
ISTS 073 ASTRO	Unknown	International 1909 (Hayford/Intl 1924)	2
JAD2001 (JAMAICA 2001)	6758	WGS84	
JAD69 (JAMAICA 1969)	6242	Clarke 1866	
JGD2000 (JAPAN)	6612	GRS 1980	
JORDAN	Unknown	International 1909 (Hayford/Intl 1924)	-
KERTAU 1948	6245	Everest 1830	-
KERTAU 1948 (MALAYSIA)	6245	Everest 1830	-3
KKJ (FINNISH GRID)	6123	International 1909 (Hayford/Intl 1924)	-
KOREAN 1985	6162	Bessel 1841	
KOREAN 1995	6166	WGS84	
KOREAN GEODETIC DATUM (KGD)	6737	GRS 1980	
LA CANOA (VENEZUELA)	6247	International 1909 (Hayford/Intl 1924)	-2
LEIGON (GHANA)	6250	Clarke 1880	-1
LISBON/LISBOA 1937 (DLx)	6207	International 1909 (Hayford/Intl 1924)	-2
LKS92 (LATVIA)	6661	GRS 1980	
LOWRANCE	Unknown	Sphere Radius 6356752 m	
LUREF (LUXEMBOURG)	Unknown	International 1909 (Hayford/Intl 1924)	
LUZON (PHILIPPINES)	6253	Clarke 1866	-1
M'PORALOKO (GABON)	6266	Clarke 1880	-
MALONGO 1987	6259	International 1909 (Hayford/Intl 1924)	-2
MERCHICH (MOROCCO)	6261	Clarke 1880	
MGI AUSTRIA	6312	Bessel 1841	5
MGI CROATIA/SERBIA	6312	Bessel 1841	5
MGI SLOVENIA	6312	Bessel 1841	5
MINNA (CAMEROON)	6263	Clarke 1880	-
MINNA (NIGERIA)	6263	Clarke 1880	-
MN COUNTY (ANOKA)	6152	MN County - Anoka	
MN COUNTY (BECKER)	6152	MN County - Becker	
MN COUNTY (BELTRAMI NORTH)	6152	MN County - Beltrami North	
MN COUNTY (BELTRAMI SOUTH)	6152	MN County - Beltrami South	
MN COUNTY (BENTON)	6152	MN County - Benton	
MN COUNTY (BIG STONE)	6152	MN County - Big Stone	
MN COUNTY (BLUE EARTH)	6152	MN County - Blue Earth	
MN COUNTY (BROWN)	6152	MN County - Brown	
MN COUNTY (CARLTON)	6152	MN County - Carlton	
MN COUNTY (CARVER)	6152	MN County - Carver	
MN COUNTY (CASS NORTH)	6152	MN County - Cass North	
MN COUNTY (CASS SOUTH)	6152	MN County - Cass South	
MN COUNTY (CHIPPEWA)	6152	MN County - Chippewa	

MN COUNTY (CHISAGO)	6152	MN County - Chisago	
MN COUNTY (COOK NORTH)	6152	MN County - Cook North	
MN COUNTY (COOK SOUTH)	6152	MN County - Cook South	
MN COUNTY (COTTONWOOD)	6152	MN County - Cottonwood	
MN COUNTY (CROW WING)	6152	MN County - Crow Wing	
MN COUNTY (DAKOTA)	6152	MN County - Dakota	
MN COUNTY (DODGE)	6152	MN County - Dodge	
MN COUNTY (DOUGLAS)	6152	MN County - Douglas	
MN COUNTY (FARIBAULT)	6152	MN County - Faribault	
MN COUNTY (FILLMORE)	6152	MN County - Fillmore	
MN COUNTY (FREEBORN)	6152	MN County - Freeborn	
MN COUNTY (GOODHUE)	6152	MN County - Goodhue	
MN COUNTY (GRANT)	6152	MN County - Grant	
MN COUNTY (HENNEPIN)	6152	MN County - Hennepin	
MN COUNTY (HOUSTON)	6152	MN County - Houston	
MN COUNTY (ISANTI)	6152	MN County - Isanti	
MN COUNTY (ITASCA NORTH)	6152	MN County - Itasca North	
MN COUNTY (ITASCA SOUTH)	6152	MN County - Itasca South	
MN COUNTY (JACKSON)	6152	MN County - Jackson	
MN COUNTY (KANABEC)	6152	MN County - Kanabec	
MN COUNTY (KANDIYOHI)	6152	MN County - Kandiyohi	
MN COUNTY (KITTSON)	6152	MN County - Kittson	
MN COUNTY (KOOCHICHING)	6152	MN County - Koochiching	
MN COUNTY (LAC QUI PARLE)	6152	MN County - Lac Qui Parle	
MN COUNTY (LAKE OF THE WOODS NORTH)	6152	MN County - Lake of the Woods North	
MN COUNTY (LAKE OF THE WOODS SOUTH)	6152	MN County - Lake of the Woods South	
MN COUNTY (LE SUEUR)	6152	MN County - Le Sueur	
MN COUNTY (LINCOLN)	6152	MN County - Lincoln	
MN COUNTY (LYON)	6152	MN County - Lyon	
MN COUNTY (MAHNOMEN)	6152	MN County - Mahnomen	
MN COUNTY (MARSHALL)	6152	MN County - Marshall	
MN COUNTY (MARTIN)	6152	MN County - Martin	
MN COUNTY (MCLEOD)	6152	MN County - McLeod	
MN COUNTY (MEEKER)	6152	MN County - Meeker	
MN COUNTY (MORRISON)	6152	MN County - Morrison	
MN COUNTY (MOWER)	6152	MN County - Mower	
MN COUNTY (MURRAY)	6152	MN County - Murray	
MN COUNTY (NICOLLET)	6152	MN County - Nicollet	
MN COUNTY (NOBLES)	6152	MN County - Nobles	
MN COUNTY (NORMAN)	6152	MN County - Norman	
MN COUNTY (OLMSTED)	6152	MN County - Olmsted	
MN COUNTY (OTTERTAIL)	6152	MN County - Ottertail	

MN COUNTY (PENNINGTON)	6152	MN County - Pennington	
MN COUNTY (PINE)	6152	MN County - Pine	
MN COUNTY (PIPESTONE)	6152	MN County - Pipestone	
MN COUNTY (POLK)	6152	MN County - Polk	
MN COUNTY (POPE)	6152	MN County - Pope	
MN COUNTY (RAMSEY)	6152	MN County - Ramsey	
MN COUNTY (RED LAKE)	6152	MN County - Red Lake	
MN COUNTY (REDWOOD)	6152	MN County - Redwood	
MN COUNTY (RENVILLE)	6152	MN County - Renville	
MN COUNTY (RICE)	6152	MN County - Rice	
MN COUNTY (ROCK)	6152	MN County - Rock	
MN COUNTY (ROSEAU)	6152	MN County - Roseau	
MN COUNTY (SCOTT)	6152	MN County - Scott	
MN COUNTY (SHERBURNE)	6152	MN County - Sherburne	
MN COUNTY (SIBLEY)	6152	MN County - Sibley	
MN COUNTY (ST LOUIS CENTRAL)	6152	MN County - St Louis Central	
MN COUNTY (ST LOUIS NORTH)	6152	MN County - St Louis North	
MN COUNTY (ST LOUIS SOUTH)	6152	MN County - St Louis South	
MN COUNTY (STEARNS)	6152	MN County - Stearns	
MN COUNTY (STEELE)	6152	MN County - Steele	
MN COUNTY (STEVENS)	6152	MN County - Stevens	
MN COUNTY (SWIFT)	6152	MN County - Swift	
MN COUNTY (TODD)	6152	MN County - Todd	
MN COUNTY (TRAVERSE)	6152	MN County - Traverse	
MN COUNTY (WABASHA)	6152	MN County - Wabasha	
MN COUNTY (WADENA)	6152	MN County - Wadena	
MN COUNTY (WASECA)	6152	MN County - Waseca	
MN COUNTY (WATONWAN)	6152	MN County - Watonwan	
MN COUNTY (WINONA)	6152	MN County - Winona	
MN COUNTY (WRIGHT)	6152	MN County - Wright	
MN COUNTY (YELLOW MEDICINE)	6152	MN County - Yellow Medicine	
MODIS SPHEROID (6371007.181 M)	Unknown	Sphere Radius 6371007.181 m	
NAD27	6267	Clarke 1866	
NAD27 (ALASKA)	6267	Clarke 1866	
NAD27 (ALEUTIAN ISLANDS EAST)	6267	Clarke 1866	
NAD27 (ALEUTIAN ISLANDS WEST)	6267	Clarke 1866	
NAD27 (BAHAMAS)	6267	Clarke 1866	
NAD27 (CANADA)	6267	Clarke 1866	
NAD27 (CANAL ZONE)	6267	Clarke 1866	
NAD27 (CARIBBEAN)	6267	Clarke 1866	
NAD27 (CENTRAL AMERICA)	6267	Clarke 1866	
NAD27 (CONUS)	6267	Clarke 1866	

NAD27 (CUBA)	6267	Clarke 1866	
NAD27 (GREENLAND)	6267	Clarke 1866	
NAD27 (MEXICO)	6267	Clarke 1866	-
NAD27 (SAN SALVADOR)	6267	Clarke 1866	
NAD27 (YUMA PROVING GROUNDS)	6267	Clarke 1866	
NAD83	6269	GRS 1980	
NAD83 (ALABAMA HPGN)	6152	GRS 1980	
NAD83 (ARIZONA HPGN)	6152	GRS 1980	
NAD83 (ARKANSAS HPGN)	6152	GRS 1980	
NAD83 (CALIFORNIA NORTH HPGN)	6152	GRS 1980	
NAD83 (CALIFORNIA SOUTH HPGN)	6152	GRS 1980	
NAD83 (COLORADO HPGN)	6152	GRS 1980	
NAD83 (FLORIDA HPGN)	6152	GRS 1980	
NAD83 (GEORGIA HPGN)	6152	GRS 1980	
NAD83 (HAWAII HPGN)	6152	GRS 1980	
NAD83 (ILLINOIS HPGN)	6152	GRS 1980	
NAD83 (INDIANA HPGN)	6152	GRS 1980	
NAD83 (IOWA HPGN)	6152	GRS 1980	
NAD83 (ITRF96)	Unknown	GRS 1980	
NAD83 (KANSAS HPGN)	6152	GRS 1980	
NAD83 (KENTUCKY HPGN)	6152	GRS 1980	
NAD83 (LOUISIANA HPGN)	6152	GRS 1980	
NAD83 (MAINE HPGN)	6152	GRS 1980	
NAD83 (MARYLAND-DELAWARE HPGN)	6152	GRS 1980	
NAD83 (MICHIGAN HPGN)	6152	GRS 1980	
NAD83 (MINNESOTA HPGN)	6152	GRS 1980	
NAD83 (MISSISSIPPI HPGN)	6152	GRS 1980	
NAD83 (MISSOURI HPGN)	6152	GRS 1980	
NAD83 (MONTANA EAST HPGN)	6152	GRS 1980	
NAD83 (MONTANA WEST-IDAHO HPGN)	6152	GRS 1980	
NAD83 (NEBRASKA HPGN)	6152	GRS 1980	
NAD83 (NEVADA HPGN)	6152	GRS 1980	
NAD83 (NEW ENGLAND HPGN)	6152	GRS 1980	
NAD83 (NEW JERSEY HPGN)	6152	GRS 1980	
NAD83 (NEW MEXICO HPGN)	6152	GRS 1980	
NAD83 (NEW YORK HPGN)	6152	GRS 1980	
NAD83 (NORTH DAKOTA HPGN)	6152	GRS 1980	
NAD83 (OHIO HPGN)	6152	GRS 1980	
NAD83 (OKLAHOMA HPGN)	6152	GRS 1980	
NAD83 (PENNSYLVANIA HPGN)	6152	GRS 1980	
NAD83 (PUERTO RICO/VIRGIN ISLANDS HPGN)	6152	GRS 1980	
NAD83 (SOUTH CAROLINA HPGN)	6152	GRS 1980	

NAD83 (SOUTH DAKOTA HPGN)	6152	GRS 1980	
NAD83 (TENNESSEE HPGN)	6152	GRS 1980	
NAD83 (TEXAS EAST HPGN)	6152	GRS 1980	
NAD83 (TEXAS WEST HPGN)	6152	GRS 1980	
NAD83 (UTAH HPGN)	6152	GRS 1980	
NAD83 (VIRGINIA HPGN)	6152	GRS 1980	
NAD83 (WASHINGTON-OREGON HPGN)	6152	GRS 1980	
NAD83 (WEST VIRGINIA HPGN)	6152	GRS 1980	
NAD83 (WISCONSIN HPGN)	6152	GRS 1980	
NAD83 (WYOMING HPGN)	6152	GRS 1980	
NAHRWAN (UAE)	6270	Clarke 1880 (RGS)	-24
NAPARIMA 1972 (TRINIDAD & TOBAGO)	6271	International 1909 (Hayford/Intl 1924)	
NEW ISRAELI DATUM (NID)	6141	GRS 1980	-1
NGO 1948 (GREENWICH MERIDIAN)	6273	Bessel (Modified)	2
NGO 1948 (OSLO MERIDIAN)	6817	Bessel (Modified)	2
NORTH SAHARA 1959	6307	Clarke 1880	-1
NORTH SAHARA 1959 (HASSI MESSAOUD)	6307	Clarke 1880	-1
NTF FRANCE (GREENWICH MERIDIAN)	6275	Clarke 1880 (IGN)	
NTF FRANCE (PARIS MERIDIAN)	6807	Clarke 1880 (IGN)	
NZGD2000	6167	GRS 1980	
NZGD49	6272	International 1909 (Hayford/Intl 1924)	
OBSERVATORIO 1966	Unknown	International 1909 (Hayford/Intl 1924)	-4
OCOTEPEQUE (COSTA RICA)	Unknown	Clarke 1866	2
OLD HAWAIIAN MEAN	6267	Clarke 1866	
OLD ISRAELI DATUM (OID)	6281	Clarke 1880 (Palestine)	-2
OMAN	Unknown	Clarke 1880	-3
ORDNANCE SURVEY 1936 (OSGB36)	6277	Airy	
PICO DE LAS NIEVES	6728	International 1909 (Hayford/Intl 1924)	-3
POINTE NOIRE 1948 (CONGO)	6282	Clarke 1880	-1
PORTUGESE 1973 (DATUM 73)	6274	International 1909 (Hayford/Intl 1924)	-2
POSGAR94 (ARGENTINA)	6694	GRS 1980	
POTSDAM/DHDN (GERMANY - FERRO)	Unknown	Bessel 1841	5
POTSDAM/DHDN (GERMANY)	6314	Bessel 1841	5
PROVISIONAL SOUTH CHILEAN	Unknown	International 1909 (Hayford/Intl 1924)	
PRS92 (PHILIPPINES)	6683	Clarke 1866	-1
PSAD56 (PROV. S. AMERICAN 1956)	6248	International 1909 (Hayford/Intl 1924)	-2
PSD93 (OMAN)	6134	Clarke 1880	-1
PUERTO RICO	6139	Clarke 1866	
QND95 (QATAR)	6614	International 1909 (Hayford/Intl 1924)	-1
QORNOQ	6287	International 1909 (Hayford/Intl 1924)	1
REUNION ISLAND	6626	International 1909 (Hayford/Intl 1924)	
REYKJAVIK 1900	6659	Danish 1876	-1

RGF-93	6171	GRS 1980	
RGNC91-93 (NEW CALEDONIA)	6749	GRS 1980	
ROME 1940 [MONTE MARIO] (GREENWICH)	6265	International 1909 (Hayford/Intl 1924)	-1
ROME 1940 [MONTE MARIO] (ROME)	6806	International 1909 (Hayford/Intl 1924)	-1
RT90	6124	Bessel 1841	4
S-42 (PULKOVO 1942)	6284	Krassovsky	
S-42 ALBANIA	6284	Krassovsky	
S-42 AZERBAIJAN/GEORGIA	6284	Krassovsky	6
S-42 CZECHOSLOVAKIA	6284	Krassovsky	
S-42 ESTONIA	6284	Krassovsky	
S-42 GERMANY	6284	Krassovsky	
S-42 HUNGARY	6284	Krassovsky	
S-42 KAZAKHSTAN	6284	Krassovsky	
S-42 LATVIA	6284	Krassovsky	
S-42 LITHUANIA	6284	Krassovsky	-4
S-42 POLAND	6284	Krassovsky	
S-42 ROMANIA	6284	Krassovsky	
S-42 RUSSIA	6284	Krassovsky	
S-JTSK (CZECH REPUBLIC)	6156	Bessel 1841	5
SAO BRAZ	Unknown	International 1909 (Hayford/Intl 1924)	-2
SCHWARZECK (NAMIBIA)	6293	Bessel 1841	6
SIRGAS 2000 (BRAZIL)	6674	GRS 1980	
SOLOMON 1968 (GUX 1 ASTRO)	6718	International 1909 (Hayford/Intl 1924)	2
SOUTH AMERICAN 1969	6291	South America 1969	-
SOUTH AMERICAN 1969 (BRAZIL)	6291	South America 1969	-
SOUTHEAST BASE	Unknown	International 1909 (Hayford/Intl 1924)	-4
SOUTHWEST BASE	Unknown	International 1909 (Hayford/Intl 1924)	-1
SWEREF99 (SWEDEN)	6619	GRS 1980	
SWISS GRID (CH1903)	6149	Bessel 1841	6
TANANARIVE 1925 (GREENWICH)	6297	International 1909 (Hayford/Intl 1924)	-1
TANANARIVE 1925 (PARIS)	6810	International 1909 (Hayford/Intl 1924)	-1
TIMBALAI 1948	6298	Everest 1830 (1967 Definition)	-6
TOKYO	6301	Bessel 1841	-1
TRINIDAD 1903	6302	Clarke 1858	-
WGS72	6322	WGS72	
WGS84	6326	WGS84	
WI COUNTY (BURNETT)	6152	WI County - Burnett	
WI COUNTY (DOUGLAS)	6152	WI County - Douglas	
WI COUNTY (SHEBOYGAN)	6152	WI County - Sheboygan	
YACARE (URAGUAY)	6309	International 1909 (Hayford/Intl 1924)	-1
ZANDERIJ (SURINAME)	6311	International 1909 (Hayford/Intl 1924)	-2

Built-in Ellipsoids

Ellipsoid Name	Semi-Major Axis (m)	
ATS77	6378135.000	
Airy	6377563.396	
Australian National	6378160.000	
Bessel (Modified)	6377492.018	
Bessel 1841	6377397.155	
Clarke 1858	6378293.645	
Clarke 1866	6378206.400	
Clarke 1880	6378249.145	
Clarke 1880 (Benoit)	6378300.789	
Clarke 1880 (IGN)	6378249.200	
Clarke 1880 (Palestine)	6378300.789	
Clarke 1880 (RGS)	6378249.145	
Danish 1876	6377019.270	
Everest 1830	6377276.345	
Everest 1830 (1967 Definition)	6377298.556	
Everest 1956	6377301.243	
GRS 1967 (Indonesia 1974)	6378160.000	
GRS 1980	6378137.000	
Helmert 1906	6378200.000	
Hough	6378270.000	
International 1909 (Hayford/Intl 1924)	6378388.000	
International 1967	6378157.500	
Interplanetary, Callisto	2408800.000	
Interplanetary, Europa	1561300.000	
Interplanetary, Ganymede	2634500.000	
Interplanetary, Io	1826100.000	
Interplanetary, Jupiter	71398000.000	
Interplanetary, Mars 1990	3393400.000	
Interplanetary, Mars 2000	3396190.000	
Interplanetary, Mars 2000 Polar Sphere	3376200.000	
Interplanetary, Mars 2000 Sphere	3396190.000	
Interplanetary, Mercury	2439000.000	
Interplanetary, Moon	1737400.000	
Interplanetary, Neptune	24712000.000	
Interplanetary, Pluto	1175000.000	
Interplanetary, Saturn	60268000.000	
Interplanetary, Titan	2575000.000	
Interplanetary, Uranus	26200000.000	

Interplanetary, Venus	6051800.000	
Interplanetary, Venus 1985	6051000.000	
Krassovsky	6378245.000	
MN County - Anoka	6378418.941	
MN County - Becker	6378586.581	
MN County - Beltrami North	6378505.809	
MN County - Beltrami South	6378544.823	
MN County - Benton	6378490.569	
MN County - Big Stone	6378470.757	
MN County - Blue Earth	6378403.701	
MN County - Brown	6378434.181	
MN County - Carlton	6378454.907	
MN County - Carver	6378400.653	
MN County - Cass North	6378567.378	
MN County - Cass South	6378546.957	
MN County - Chippewa	6378476.853	
MN County - Chisago	6378411.321	
MN County - Cook North	6378647.541	
MN County - Cook South	6378647.541	
MN County - Cottonwood	6378514.953	
MN County - Crow Wing	6378546.957	
MN County - Dakota	6378421.989	
MN County - Dodge	6378481.425	
MN County - Douglas	6378518.001	
MN County - Faribault	6378521.049	
MN County - Fillmore	6378464.661	
MN County - Freeborn	6378521.049	
MN County - Goodhue	6378434.181	
MN County - Grant	6378518.001	
MN County - Hennepin	6378418.941	
MN County - Houston	6378436.619	
MN County - Isanti	6378411.321	
MN County - Itasca North	6378574.389	
MN County - Itasca South	6378574.389	
MN County - Jackson	6378521.049	
MN County - Kanabec	6378472.281	
MN County - Kandiyohi	6378498.189	
MN County - Kittson	6378449.421	
MN County - Koochiching	6378525.621	
MN County - Lac Qui Parle	6378476.853	
MN County - Lake of the Woods North	6378466.185	
MN County - Lake of the Woods South	6378496.665	

MN County - Le Sueur	6378434.181	
MN County - Lincoln	6378643.579	
MN County - Lyon	6378559.758	
MN County - Mahnomen	6378586.581	
MN County - Marshall	6378441.801	
MN County - Martin	6378521.049	
MN County - McLeod	6378414.369	
MN County - Meeker	6378498.189	
MN County - Morrison	6378502.761	
MN County - Mower	6378521.049	
MN County - Murray	6378617.061	
MN County - Nicollet	6378403.701	
MN County - Nobles	6378624.681	
MN County - Norman	6378468.623	
MN County - Olmsted	6378481.425	
MN County - Ottertail	6378525.621	
MN County - Pennington	6378445.763	
MN County - Pine	6378472.281	
MN County - Pipestone	6378670.401	
MN County - Polk	6378445.763	
MN County - Pope	6378502.761	
MN County - Ramsey	6378418.941	
MN County - Red Lake	6378445.763	
MN County - Redwood	6378438.753	
MN County - Renville	6378414.369	
MN County - Rice	6378434.181	
MN County - Rock	6378624.681	
MN County - Roseau	6378449.421	
MN County - Scott	6378421.989	
MN County - Sherburne	6378443.325	
MN County - Sibley	6378414.369	
MN County - St Louis Central	6378605.783	
MN County - St Louis North	6378543.909	
MN County - St Louis South	6378540.861	
MN County - Stearns	6378502.761	
MN County - Steele	6378481.425	
MN County - Stevens	6378502.761	
MN County - Swift	6378470.757	
MN County - Todd	6378548.481	
MN County - Traverse	6378463.746	
MN County - Wabasha	6378426.561	
MN County - Wadena	6378546.957	

MN County - Waseca	6378481.425	
MN County - Watonwan	6378514.953	
MN County - Winona	6378453.688	
MN County - Wright	6378443.325	
MN County - Yellow Medicine	6378530.193	
Mercury 1960	6378166.000	
Modified Airy	6377340.189	
Modified Everest 1948	6377304.063	
Modified Mercury 1968	6378150.000	
South America 1969	6378160.000	
Southeast Asia	6378155.000	
Sphere Radius 6356752 m	6356752.314	
Sphere Radius 6370997 m	6370997.000	
Sphere Radius 6371000 m	6371000.000	
Sphere Radius 6371007.181 m	6371007.181	
Sphere Radius 6371204 m	6371204.000	
Sphere Radius 6378137 m	6378137.000	
Sphere Radius 6378388 m	6378388.000	
WGS66	6378145.000	
WGS72	6378135.000	
WGS84	6378137.000	
WI County - Burnett	6378414.960	
WI County - Douglas	6378414.930	
WI County - Sheboygan	6378285.480	
War Office (McCaw 1924)	6378300.000	